#1027968631 ID: 38073189 GB 991 .A6 S26 2003

THE SAN SIMON STUDY

An Examination of 120 Years of Environmental Changes and of Efforts to Control Them

January, 2003

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1. Introduction

More than a century ago, a number of natural and human factors converged to cause catastrophic erosion in the San Simon Valley of southeastern Arizona. Although the region itself is sparsely populated, the terrain relatively level, and the climate semiarid, periodic stream discharges from the San Simon watershed since then have caused recurrent downstream damage.

Part of the threat posed by erosion of the San Simon is direct damage to the productivity of the immediate environment to support productive uses such as grazing lands for livestock and habitat for wildlife. Downstream, runoff from the San Simon also threatens the rich agricultural lands of the Gila River Valley as a consequence of erosion and deposition of sediment in fields. Further downstream, increased runoff and sediment transport from the watershed complicates management of waters impounded behind the San Carlos reservoir and, ultimately, reduces its storage capacity through sediment deposition.

The Safford Office of the Bureau of Land Management (BLM) has responsibility for the bulk of land area in the San Simon watershed. In response to the problems spawned there, a number of engineering and management interventions have been put in place in the San Simon at various times by the Federal government over 70 years. These efforts were intended to arrest erosion and to reclaim, to some degree, the former productivity of the valley. Most dramatic of these are a network of engineered water and sediment control structures at a variety of scales. Some are spectacular, spanning the floodplain of the San Simon to contain sediment. Others direct major tributary flow down spillways to arrest headward erosion. More are minor in their scope, such as gully plugs or weirs constructed from local materials that are intended to retard – rather than arrest – headward erosion of minor tributary channels.

In addition to direct engineering interventions, there have been a host of experimental interventions in resource management that were intended to manipulate the surface and vegetation cover on the surrounding uplands to achieve similar ends: reduce overland flow, stabilize soil and, as a consequence, increase biological productivity. By their nature, these interventions have been less systematic, more scattered and sporadic, and thus more difficult to track through time.

Despite the level of activity in the San Simon that was undertaken to address these problems, it was done on no particular schedule and according to no specific plan. Equally important, projects were distributed among several different disciplinary and administrative units rather than serving as the core of a long-term comprehensive program. The interventions that have been implemented have generated data and information that cannot be replicated unless done again over a comparable time period into the future.

Conditions in the San Simon are not unique to this particular valley. The length of time required to realize results of any intervention in the management of natural resources and to understand the processes that determine those results is measured in timescales that range from generations to centuries, rather than years to decades. Even after 70 years of intentional management, the causes and effects of changes on the landscape are difficult to unravel even where conditions are carefully controlled (Havstad and Schlesinger, 1996).[1] Where controls and records are not fully understood – like the San Simon – the task is considerably more difficult. However, until the lessons these changes might teach us are learned, we cannot make informed, wise or responsible decisions about how to proceed into the future.

Outlined below Sections 2 and 3, are the tasks we feel would constitute a full analysis of the recent environmental history of the San Simon, and what the outcomes of various interventions has been. The primary purpose of the study is to support the planning effort that the BLM will ultimately undertake. The results of this study would provide both a "big picture" of environmental history and land management in terms of time and space, but also the set of detailed pictures that would make it credible. However, understanding the uncertainties of budget, we propose a set of phases by which the project could be carried out over several years. In addition, the work proposed here is intended to complement other activities currently underway or planned by the Bureau of Land Management. In particular, this supports the "Geomorphic and Engineering Analysis" proposed by the Bureau of Reclamation.

2. Objectives

We envision a progression six objectives that should be satisfied to arrive at an understanding of the San Simon watershed and its management history. These include:

(1) characterize environmental changes over the past century ;
(2) assess the probable causes and consequences of those changes from physical, management, and social standpoints;
(3) examine and explain the interventions that were implemented to address these changes;
(4) consider the economic, political and social contexts within which the interventions were designed and implemented; and,
(5) assess the effectiveness, benefits, and costs of projects to-date.

As both a tool for and outcome of these activities, an ultimate objective will be to:

(6) develop a digital data base of existing and derived maps, photographs and documents that are required to pursue these objectives

[1] Havstad, K. M. and W. Schlesinger. 1996. Reflections on a century of rangeland research in the Jornada basin of New Mexico. In: J. R. Barrow, E. D. McArthur, R. E. Sosebee, and R. J. Tausch, eds. *Proceedings: Symposium on Shrubland Ecosystem Dynamics in a Changing Climate*; 1995 May 23-25; Las Cruces, NM. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station.

3. Tasks

3.1. Characterize environmental change in the San Simon

Changes in the environment of the San Simon watershed have been captured in published historical documents (including maps and photographs), state and county records, unpublished data and studies of several Federal agencies, and published secondary summary studies of many of these sources. The purpose of this task would be to assemble these documents and develop from them a history of change in the watershed that was chronologically and geographically complete. This would include maps of of physical change (i.e., focused on topography, but also including hydrology, and vegetation), land ownership/management change, and site-specific observations over time (e.g., precipitation; stream flow; well records; channel cross section; vegetation plot observations; erosion plot observations; etc).

From this data we will develop a model of three "states" of the San Simon watershed: (1) current (2000); (2) pre-intervention (1935; worst case); and (3) pre-event (1880; best case, initial state). We feel that this will be a useful set of products by which to develop future objectives and frame public discussion by helping to describe (1) what has been achieved to-date, (2) what is theoretically possible, and (3) what might be economically feasible.

3.1.1. Establish change based on documentary evidence

Environmental change will be reconstructed using historical documents (primary and secondary) for at least three dates (as above). In particular, we will concentrate on locating specific sites of change and noting when they occurred. In addition, a complementary climate history will be developed based on climatological station data, and existing tree ring chronologies. This will result in map and narrative products.

3.1.2. Establish historical land use/land tenure patterns

Using the same historical documentary approach, we will reconstruct land use and land tenure patterns over the past 130 years. This will result in map and narrative products.

3.1.3. Establish water table change

There are a number of wells located within the valley for which water level data exist. The location of wells will be digitized. Using well records, it will be possible to develop water table surfaces for a series of selected dates. The intent would be to show (1) what the effects of channel downcutting on lowering ground water levels (if sufficient data are available), and (2) the effect of erosion and sediment control structures on raising ground water levels.

3.1.4. Establish change based on historical repeat photography

We will revisit sites from which photographs and renderings were made over the past 130 years. These sites will be rephotographed and the photographs will be digitally scanned and archived in a geographically referenced relational data base, comparable to what we

have developed for the Santa Rita Experimental Range. (http://ag.arizona.edu/SRER/photos.html)

3.1.5. Establish surface change from topographic maps

The existing 1935 plane table survey will be digitized and a digital elevation model (DEM) will be developed from it. The DEM that is currently being developed from recently generated orthophotography will be acquired. The two will be registered and subtracted to identify areas of change. This will permit a quantitative assessment of the impact of erosion control and sediment retention structures.

3.1.6. Establish land cover change from aerial photography

Aerial photography from 1935 and the current orthophotography will be interpreted manually to characterize conditions then and now. Interpretations will be digitized and areas of change will be identified. Change will be documented further using data from permanent plots, where possible.

3.1.7. Corroborate observations based on oral history

Long term residents will be interviewed to capture their recollection of past conditions and the changes that they have personally observed. This set of independent observations will complement land use history (3.1.1.) and will also provide additional local perspectives on social, economic, and political contexts in which change occurred (3.4)

3.2. Assess probable causes of change

Various hypotheses have been advanced to explain the changes observed in the San Simon watershed that include (1) climate variation; (2) land use; and (3) land management policy. While it is clear that a variety of causes may have converged to initiate these events (i.e., overgrazing and physical surface disruption in the 1880's followed by severe dry and then wet years in the 1890's), we assess each of the proposed change vectors in detail against the evidence generated in under task 3.1.

3.2.1. Review current hypotheses of change

There has been a great deal of debate about the causes of environmental change.[2] Confounding attempts to unravel the relative contribution of each possible cause is that they seldom act independently in time or space. We will review and document these hypotheses and suggest where they might apply in the San Simon.

3.2.2. Compare hypotheses against established evidence (3.1)

By (1) documenting patterns of change both in time and space (3.1.1, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 3.1.7), (2) establishing historical climate patterns (3.1.1), and (3) documenting land use/land tenure patterns (3.1.2), it will be possible to test hypotheses of change against the outcomes observed in the San Simon. This could have a bearing on management policy options that might be considered in the future.

[2] Bahre, C.J. 1991. *A Legacy of Change: Historic Human Impact on Vegetation of the Arizona Borderlands*. University of Arizona. Tucson. 231 pp.

3.3. Examine interventions

Hypotheses of change have resulted in the implementation of several different types of intervention (i.e., physical structures; management practices). We will document the outcomes of each intervention that has been implemented in the San Simon.

3.3.1. Measure effect of structures

A number of water and sediment control strucutures have been constructed in the San Simon over the past 70 years. Reasonable records have been maintained for changes through time. We will revisit these structures and measure – to the degree possible – the changes that are associated with each. Three classes of structures have be used:

- Large-scale main channel structures
- Large-scale side channel structures
- Small-scale side channel structures

3.3.2. Measure outcome of vegetation treatments

Vegetation cover has also been manipulated to effect the movement of surface water and hence soil. Some records have been maintained that describe initial treatments, as well as monitoring data that measure subsequent changes. We will revisit these treatments and measure changes associated with each. These interventions include:

- Channel plantings
- Upland revegetation
- Upland brush removal

3.4. Establish context

The impacts experienced by specific groups (e.g., downstream farmers) have favored some interventions more than others (i.e., physical structures) that had more immediate and direct effects, but some unforeseen outcomes (see 3.5). We will examine the historic social, political (including bureaucratic), economic, and scientific factors that led to the implementation of specific interventions. This will involve a review of government archival materials, as well as interviews with various agency personnel and local residents.

3.4.1. Develop a chronology of interventions

The chronology of interventions is reasonably well understood. The purpose of this task is to place the intervention in its fuller historical context so that interventions can be better understood.

3.4.2. Develop history of legislation leading to interventions

To the degree possible, we will attempt to unravel the history of the legislation that led to the implementation of each intervention (e.g., legislation sponsors; the constituency to which they were responding; etc.)

3.4.3. Establish scientific and technological basis of interventions

Interventions where designed within the scientific and technical context of the time. We will attempt to recapture what were considered "best practices" of the time and the scientific foundation upon which they were based.

3.4.4. Establish institutional framework of interventions

Just as there is a legislative, scientific, social, and economic context in which interventions are undertaken, there is also an institutional context in which it is executed. Over the past 70 years, a number of different agencies have played a role in managing the San Simon, and their respective roles have changed over that time span. We wish to understand the specific institutional context in which interventions were undertaken.

3.4.5. Develop local historical political ecology affecting interventions

Different groups of people have more influence than others at different points in time (e.g., farmers; ranchers; tribes). We wish to understand the relationships among the groups of people affected by management practices in the San Simon, and how they changed through time.

3.4.6. Develop national historical political ecology affecting interventions

Similar patterns of power and influence of different groups were operating at the national level. We also need to understand these patterns – particularly as they might related to economics – to place actions that were taken in the San Simon in a national context.

3.5. Assess interventions

A more complex assessment must deal with the comparative costs and benefits of interventions. Some of these will be biophysical. For example, water and sediment control structures reduce flood damage downstream that affects farmers. These same structures enhance sediment accumulation and forage production upstream that favors ranchers. However, flow from the San Simon into the Gila River is greatly reduced (a potential negative for farmers) while raising ground water levels in the San Simon (a positive for ranchers and wildlife). These outcomes clearly have corresponding economic costs and benefits.

3.5.1. Assess outcomes for entire Valley

The interventions undertaken in the San Simon taken as a whole have some total impact on the nature of the valley. Some of these will include changes in water and sediment yield measured at its confluence with the Gila River. We will summarize these outcomes to show total impact. Similarly, there have been impacts on geomorphic processes in the Valley, in terms of erosion and deposition. We interpret changes within a geomorphic process framework and summarize that impact. As a consequence of these changes, there have also been changes in total biomass within the watershed and, hence, a change in riparian function, particularly in the case of habitat. Again, we will summarize total impact from a riparian function perspective to assess total impact.

3.5.2. Compare outcomes of individual interventions

We will compare the outcomes of individual interventions. The purpose will be to assess – to the degree possible – the relative (rather than absolute) effectiveness of individual interventions. Again, the purpose will be to inform the design of subsequent management strategies.

3.5.3. Assess status of interventions (state/transition)

Essentially all the interventions put in-place have ecological impacts. Thus, it is important to make some assessment as to the current ecological status – whether it is currently in transition, or whether it has reached another state.[3] Understanding and accepting this has a great impact on choosing among management objectives.

3.5.4. Establish costs and benefits of interventions

With a reasonably accurate assessment of changes, and a reasonable guess at what future conditions might be, it is possible to begin an analysis of what the costs and benefits might be that accompany those changes.

3.6. Develop database and Web Site Delivery

As noted at the outset, the bulk of this program is based on information that already exists. A major effort must be devoted to: (1) data exploration (identification and standardization); (2) data organization and database development; (3) website development; and, (4) computer/web based decision support tools for public land management. The initial intent is to provide information necessary for the assessment tasks. The longer term objective is to develop a set of web-based tools and data for research that might be used by BLM staff, other researchers, the public-at-large and all those who might be interested in dealing with public land management world-wide.

3.6.1. Standardize and digitize pertinent data and information resources

Drawing on the experience of previous related projects [Managing Arid and Semi-Arid Watersheds (http://ag.arizona.edu/OALS/watershed/index.html) and the Public Lands Grazing Management: Walker Basin Allotment (http://ag.arizona.edu/vbarv/walker/walker.html)], a Field Data Coordinator from the UA School of Renewable Natural Resources (SRNR) working closely with the Arid Lands Information Center (ALIC), and the BLM Safford Office, will organize, categorize, and digitize the available materials on the San Simon watershed. In addition, a Web and database programmer from the Arizona Remote Sensing Center (ARSC) will create a relational database structure for the Web which will take into consideration compatibility with similar databases developed in related projects involving other Arizona agencies.

3.6.2. Create a relational database structure for managing past and future data

Specialists in Web design and content organization from ALIC will create an extensive Web site on the San Simon that will provide for ease of use in locating information and

[3] Westoby, M., Walker, B., and Noy-Meir, I. (1989). Opportunistic management for rangelands not at equilibrium. *Journal of Range Management* 42:266-274.

data. Maximum functionality will guide the user through general topics down to data analysis and GIS tools. Design features will utilize the most current knowledge on interoperability, techniques for quick page loads, and attention to American Disabilities Act (ADA) guidelines.

3.6.3. Create a World Wide Web site for disseminating information and data

A GIS Specialist, working with ARSC will build on the knowledge gained in developing GIS user applications for rangeland management (See RangeView URL below) and for watershed data from the former Arizona Watershed Program (http://alic.arid.arizona.edu/watershed/ws8.asp) to develop GIS and attribute-driven textual interfaces to the relational database containing the San Simon data. These interfaces will link to sophisticated graphing, tabular, mapping capabilities useful for educational, scholarly, and decision-making purposes. Through a project-to-project partnership, the San Simon watershed will be added to the "lead user" list on the vegetation dynamics tools on the RangeView website (http://rangeview.arizona.edu/), allowing stakeholders the ability to assess trends in vegetation greenness over time and space.

3.6.4. Develop Web-based GIS applications and decision support tools for public land management

Cooperative Extension personnel, working with other project team members, will organize two meetings to bring together representatives from other agencies and interest groups (see list of Other Related Partners). The first meeting will be held at the beginning of the project to gain input into the development of the Web site and GIS and analysis tools and to maximize interagency use. The second meeting will be held toward the end of the project to assess final results and to develop a plan of action for interagency problem-solving and continued sharing of data. Representatives of each group will be asked to serve as advisors to the project during the interim period and will be part of an iterative process in the development of the Web-based deliverables.

3.6.5. Involve agency personnel in the design and evaluation of the Web site and tools

All external project partners and the BLM Project Lead will be involved in compiling a report on the results of this project, and including the interagency action plan developed with the Other Related Partners.

4. Approach

Activity 3.6 (Data base development) plays a critical role in each phase and thus should be considered a continuing activity that addresses each set of tasks within each phase.

4.1. Phase 1

Phase 1 would comprise the following tasks. The intent of this phase is to generate much of the information that would be used in subsequent phases.

3.1.1. Establish change based on documentary evidence (underway)
3.1.3. Establish change based on historical repeat photography (underway)
3.1.4. Establish surface change from topographic maps
3.3.2. Measure outcomes of vegetation treatments (underway)
3.6. Develop database
3.6.1. Standardize and digitize pertinent data and information resources
3.6.2. Create a relational database structure for managing past and future data

4.2. Phase 2

Phase 2 would concentrate on finishing the generation of basic information products.

3.1.2. Establish water table change
3.1.5. Establish land cover change from aerial photography
3.1.6. Corroborate change based on oral history
3.3.1. Measure effect of structures
3.6.3. Create a World Wide Web site for disseminating information and data
3.6.4. Develop Web-based GIS applications and decision support tools for public land management
3.6.5. Involve agency personnel in the design and evaluation of the Web site and tools

4.3. Phase 3 would focus on analysis and reporting.

3.2.1. Review current hypothesis of change
3.2.2. Compare hypotheses against established evidence (3.1.)
3.4. Establish context
3.5. Assess interventions

5. Costs

The following costs are associated with the tasks detailed in Section 3.

5.1. Characterize environmental change in the San Simon	
Personnel (Salaries & Fringe)	$68,000
Investigators, 4 Graduate research associates	
Operations	$24,000
Data processing, supplies	
Travel and Per Diem	$9,000
Field visits, Stakeholder meetings	
Indirect Costs (15% CESU Master Agreement)	$15,150
Total	$116,150
5.2. Assess probable causes of change	
Personnel (Salaries & Fringe)	$48,000
Principal investigator	
Operations	$2,500
Data processing, supplies	
Travel and Per Diem	$2,000
Field visits, Stakeholder meetings	
Indirect Costs (15% CESU Master Agreement)	$7,875
Total	$60,375
5.3. Examine interventions	
Personnel (Salaries & Fringe)	$23,000
Graduate research associate, undergraduate	
Operations	$5,000
Data processing, supplies	
Travel and Per Diem	$4,000
Field visits, Stakeholder meetings	
Indirect Costs (15% CESU Master Agreement)	$4,800
Total	$36,800
5.4. Establish context	
Personnel (Salaries & Fringe)	$63,500
Principal investigator (half time),	
1 Graduate research associate	
Operations	$5,000
Data processing, supplies	
Travel and Per Diem	$4,000
Field visits, Stakeholder meetings	
Indirect Costs (15% CESU Master Agreement)	$10,875
Total	$83,375

5.5. Assess interventions	
Personnel (Salaries & Fringe)	$39,500
Principal investigator (quarter time), 1/2 Graduate research associate	
Operations	$5,000
Data processing, supplies	
Travel and Per Diem	$4,000
Field visits, Stakeholder meetings	
Indirect Costs (15% CESU Master Agreement)	$7,275
Total	$55,775
5.6. Develop database and Web Site Delivery	
Personnel (Salaries & Fringe)	$75,000
Investigators, Field Data Coordinator, Web Content and Design, Web database programme,r GIS specialist	
Operations	$15,000
Data processing, supplies	
Travel and Per Diem	$4,000
Field visits, Stakeholder meetings	
Indirect Costs (15% CESU Master Agreement)	$14,100
Total	$108,100

RESTORATION OF THE SAN SIMON

Background

Location:
The San Simon River originates along the Arizona-New Mexico State line about 12 miles north of the United States-Mexico international boundary. It flows in a northwesterly direction for about 100 miles and empties into the Gila River near Safford, Arizona. The average slope of the drainage is between 0.2 and 0.3 percent (0.2 to 0.3 feet loss of elevation per 100 feet of horizontal distance). The San Simon produces an average of 8,550 acre-feet of water per year. Suspended sediment in San Simon waters as they leave the watershed varies widely, from a low of about 3,000 parts per million to a high of over 180,000 parts per million. This makes the San Simon Watershed one of the major contributors of suspended sediment and salts that flow into the Gila River.

Acreage/Land Status:
The watershed covers about 1,966 square miles (1,258,690 acres) or 5,092 square kilometers (509,200 hectares). The Bureau of Land Management manages 49.8 percent of the watershed, while private lands account for 24.9 percent, 15.3 percent are state lands (Arizona and New Mexico), 9.8 percent are managed by the United State Forest Service, and the remaining 0.1 percent is managed by the National Park Service.

Elevation:
Watershed elevations range from about 2,900 feet above sea level at the river's mouth to 9,800 feet in the Chiricahua Mountains on the southern end of the watershed. Most of the 626,909 acres of the land managed by the BLM are below 5,000 feet in elevation and are generally situated on the downstream half of the watershed.

Climate:
The San Simon watershed is semi-arid for most of its area. Precipitation varies from about 8 inches on the northern (low elevation) end to over 20 inches in the Chiricahua Mountains. About 60 percent of the rainfall occurs during the 6 hottest months, usually as high intensity, localized thunderstorms. The remaining forty percent of the precipitation, received in the cooler months, generally occurs as relatively gentle, widespread rains. Snow is received on the watershed each year. At the lower elevations, it generally covers the ground for less than 12 hours and at the higher elevations, may remain for 5 to 6 months. Temperatures are relatively mild on the BLM-administered lands with seasonal extremes ranging from slightly over 100 degrees for summer highs to around 10 degrees for winter lows. The frost-free season on the lower part of the watershed in 190 to 210 days.

Historical Watershed Conditions:
Historical mention of the San Simon Valley in the early 1800s gives conflicting pictures of the nature of the valley. Will C. Barnes, an Arizona pioneer, cattleman, cavalryman, and

Congressional Medal of Honor winner, who visited the valley in the early 1880s, remembered it as a grassy, well-watered area about 60 miles long and 40 miles wide. He remembered the stream as being intermittent, with cottonwoods and willow thickets along its banks. An 1879 map of southeastern Arizona marks the San Simon as the "Rio de Sauz" or River of Willows and illustrates the stream as being underground for much of its course.

Parke, in 1854, described the stream as having no trees or bushes to indicate the course of the stream. The surrounding valley was vegetated by creosote bush, saltbush, and yucca with grass being scarce. Hutton, in 1859, described the San Simon as being intermittent and flowing for about six months of the year.

Historical research and scientific knowledge of soils, climate, and vegetation leads one to believe that the San Simon Valley was a broad grassy plain bisected by an intermittent stream with little apparent erosion. The broader, flatter areas were probably covered by sacaton and tobosa grass with few tress. Some willows may have grown in the wetter areas and cottonwoods were certainly present at San Simon Cienega, near the Arizona-New Mexico state line. There is little evidence that the stream flowed on a perennial basis. It is fairly certain that little channel erosion was present and the bottom was well vegetated. Early cattlemen have described the valley as a sea of grass with unlimited potential for raising livestock.

By 1919, the San Simon was recognized in U.S. Senate Document 436 as needing extensive restoration. From 1883 to 1916, in the short span of 33 years, head cutting (gullying) of the San Simon advanced some 60 miles up the channel and ranged from 10 to 30 feet deep and 40 to 800 feet wide.

What happened in a mere 33 years to change a grassy bottomland into a series of deep gullies with almost no vegetation? Several theories have been proposed. The most widely espoused proposal is that overgrazing initiated changes in vegetation and runoff patterns. Some researchers have given more credence to a combination of man's discrete activities, such as development of wagon roads, building railroads, and alteration of stream channels. Another hypothesis is that the erosion was geological, caused by the earthquake in northern Sonora in 1887, and the land is trying to regain equilibrium. The third theory places blame on climatic change with minor changes in rainfall patterns and frequencies initiating the erosional sequence. Cooke and Reeves, in their book "Arroyo and Environmental Change in the American Southwest" (1975), have proposed that each of the theories probably had a contribution to the rapid erosional sequence. Cooke and Reeves discount any one action as being solely to blame. They cite similar erosional sequences occurring in New Mexico on the Rio Puerco, in Arizona on the San Pedro and the Santa Cruz, and on several California streams during the same time period.

Possible Discrete actions that contributed to the rapid erosion include:

- Overgrazing by livestock in the 1880s (an estimated 50,000 head were grazing in the valley at one time
- Extended drought, broken by intense thunderstorms (1890s)
- Construction of a drainage ditch from the Gila River up the San Simon Valley In 1883

- Development of wagon roads and increased freight use during the early
- Development of copper mines in the area (1880s)
- Beginning construction of the Gila Valley, Globe, and Northern Railway (1884)
- Earth quack in the 1880's

In 1934, the Soil Erosion Service (later to become the Soil Conservation Service) and the Civilian Conservation Corps (CCC) began numerous erosion control measures on the San Simon watershed. Numerous CCC camps in the area, under both the Soil Erosion Service and the Grazing Service (which later became the Bureau of Land Management) began work on diversion dikes, water spreaders, detention dams, rangeland seedlings, and gully plugs. The Grazing Service, in 1949, became the Bureau of Land Management and responsibility for erosion control work on public lands passed to it.

Watershed Management 1940 to the Present:
Although serious erosion still exists on the San Simon, progress has been made to heal areas eroded at the turn of the century. From about 1935 to 1940, numerous surveys of erosion were conducted both by the Soil Conservation Service and the Grazing Service, and the first plans to control erosion and begin rehabilitation of the main channel were formulated. At this same time, Civilian Conservation Corps personnel were constructing gully plugs in small washes, building spreader dikes, seeding eroded areas, and constructing facilities to manage livestock on the eroded watershed.

The first major structures on the watershed were constructed in 1940 by the Civilian Conservation Corps. Two dams, Cienega No. 1 and Cienega No. 2, were built near the Arizona-New Mexico state line at the head of active channel erosion to protect the still-existing San Simon Cienega. These dams were drop-type structures designed to prevent further head cutting up the channel and to slow the water as it passed into the eroded portions of the channel.

Goat Well Drop Structure was also built in 1940, on a tributary of the San Simon, Slick Rock Wash. This dam was designed to prevent erosion of the wash and slow waters entering the San Simon, similar to the Cienega dams.

Construction of the San Simon Fan Structure was completed in 1953. Due to a greater than 100-year flood, the structure failed in 1954 and was rebuilt in 1955. This structure was the first detention dam of the mainstream of the San Simon designed to heal the eroded channel. The Cienega dams, built in 1940, were designed simply to stop further head cutting.

The San Simon Fan Structure has succeeded beyond everyone's expectations. The channel has been completely rehabilitated for 44,000 feet above the structure. Evidence that channel refilling is continuing is visible for 10 miles above the structure. In 1990, the area of fill was measured and it was found that the San Simon Fan Structure had trapped 19 million tons of silt since 1955! We estimate that by the year 2000 over 25 million tons of silt will have been trapped in the channel flood plain.

From strictly a mechanical or engineering standpoint, the dam should have affected the channel for only a few thousand feet above it. The planting of grasses and vegetation above the dam as

the channel rehabilitated allowed flood waters to slow down farther and farther upstream and drop their silt load, causing the effects of the dam to be magnified upstream. The Contest Well seeding, in 1968, has been extremely successful. Not only does the vegetation slow the floodgates and allow silt to drop out, the vegetation provides feed for cattle and habitat for wildlife. The 600-acre seeding provides six-month winter grazing for up to 170 head of cattle. Before construction of the San Simon Fan, only 4 to 6 head of cattle could graze the same area. During the summer months, the seeding is rested and conditions are favorable for a large buildup of rodent populations. In winter, the rodent escape cover is grazed off and the rodents are susceptible to predation by migrating and wintering raptors in the area.

By 1956, seven side channel structures had been completed, including Creighton and HX. In 1957, a "Stop Work Order" was imposed by the Secretary of the Interior due to claims from downstream water users that detention dam construction was reducing amounts of water delivered for irrigation purposes.

The San Simon Community Watershed Plan, completed in 1963, analyzed effects of existing and proposed structures on rehabilitation and effects on water availability for downstream users. Consequently, the "Stop Work Order" was lifted in 1965 when the Secretary was convinced that losses of water to downstream users was minimal compared to the need to control erosion and rehabilitate the San Simon watershed.

Between 1967 and 1972, seven additional side channel structures were completed: Ryan Dam (1967), Ryan Dike (1968), Whitlock Dam (1968), West Doubtful (1969), Cove Darn, "111" Dam, and Sands Draw Dam (1972). Several upland seedings were tried during this time period. Due to the erratic nature of the climate, seedings in upland areas have not been successful. Even areas that appeared to be a success for a few years later died out and returned to a pre-treatment state.

From 1972 to 1979, no funding was received for further watershed improvement work in spite of the existence of the approved community watershed plan. The Upper Gila-San Simon Grazing Environmental Impact Statement, finalized in 1979, addressed the need for, and effects of, the proposed Tanque and San Simon Barrier Dams.

A special Congressional appropriation in 1980 authorized the construction of Tanque and San Simon Barrier Dams. The San Simon Barrier Darn was completed in 1980, but a subsequent engineering examination revealed problems with the proposed location of the Tanque Dam. A new site was found upstream and the dam site was renamed the Timber Draw Dam. To date, it has not been built.

The last detention dams built in the San Simon watershed were the Slick Rock Detention Dam (1981) on Slick Rock Wash, a tributary of the San Simon, and Creosote and South Well Detention Dams (1982), also built on tributaries.

The San Simon Barrier Dam, since its completion in 1980, is estimated to have retained 5 to 6 million tons of silt and has totally regraded the channel for more than 2,000 feet upstream. Effects can be measured as much as 19,700 feet upstream. The flooded, regraded areas behind

the dam have been planted with trees and grasses to stabilize the area and provide wildlife habitat. Livestock are excluded from about 300 acres directly behind the dam to allow vegetation to recover. Livestock will be allowed to graze the area after its recovery is complete.

A Coordinated Resource Activity Plan was developed in 1984 to set long-range goals and priorities for all major resources. The plan outlined the positive benefits to watershed, wildlife, recreation, and livestock grazing afforded by the channel rehabilitation. A goal was to establish a vegetation mosaic of 80 percent grasses and 20 percent shrubs and trees in the restored channel to provide maximum benefits for wildlife, watershed and livestock grazing.

It appears, after more than 50 years of observing results from various watershed projects, the most effective treatments are main channel structures. Side channel structures, with the possible exception of the HX Detention Dam, have been ineffective in regrading channels for long distances upstream, mainly due to the slope of the channels. The side channel structures have served to stop further head cutting of channels upstream and they do reduce water velocities and thus reduce sediment transport and erosion. An unplanned side benefit has been the reduction of peak flows from floodgates. This reduction of peak flood water has protected the downstream areas of Solomonville and the private farmland, county roads, and State Highway 70 from millions of dollars in flood damage.

Future Plans

To reach the objective of restoring the watershed to a condition similar to that present in the 1870s, one more main channel structure is needed: Timber Draw. Engineering design has been completed, but a cultural inventory completed in 1981 revealed conflicts with cultural resource values. Work since that time has been directed at mitigation by excavation and salvage of the area, with much of the work being done by volunteers.

Although it took only 33 years to erode the San Simon Valley, it will take over 100 years to restore it. Proper rangeland management is critical to achieving the goal. Major emphasis for rehabilitation has been on detention dam construction in the past. Future management will focus on livestock management techniques and management of the restored flood plains to sustain suitable species of grasses, shrubs, and trees. Prescribed fire will grow in importance for maintaining desired vegetation composition and cover. Sustaining a mosaic of vegetation communities for watershed protection, wildlife habitat, recreation, and livestock grazing are the future goals.

The Clean Water Act coupled with an active grass roots watershed group, Gila Watershed Partnership has emphasized the need for good resource management to enhance the quality and quantities of our waters for present use and future generations. We hope to evaluate the 1968 San Simon Restoration Plan using Bureau resource specialists and help from other interested parties to determine the progress we have made and needs for the future. This will be accomplished as time and budget become available for the complex evaluation that is needed.

The following is a list of major investments in the San Simon in terms of structure. There is a variety of other projects wildlife, range recreations not listed in this table. The Bureau of Land

Management has expended Millions of the years in the San Simon and it is time now to evaluated and come to a clear picture of what we and the public wants on the San Simon.

SAN SIMON WATERSHED PROJECTS EXCLUDING CIVILIAN CONSERVATION CORPS PROJECTS

Project	**Cost**
San Simon Barrier	1,300,000
Slickrock	232,000
San Simon Fan	271,000
Creighton	140,000
South Well and Creosote	133,000
111 Dam and Cove	113,000
Whitlock (abandoned	193,000
HX Dam	93,500
Sands Draw	70,000
West Doubtful	63,000
Ryan	20,000
Goat Well	13,000
West Olsen	4,000
Halfway	10,000
West Halfway	1,000
Olga	10,000
Dikes	
Olsen	27,000
Reservoir	17,000
Rock House	21,000
Ryan	40,000
Seedings	
Contest Well	5,853

New Well	22,551
Antelope Well	26,297
Ryan	17,264
Ryan Dike	2,717
Timber Draw	13,987
Van Gausig	17,622
Wells	
Construction Well	13,000
Barrier Well	15,000
Fencing	
Seedings, Exclosures	50,000
San Simon fencing	?
Total	2,955,291

Timber Draw Detention Dam Engineer's Preliminary Estimate - 1988

Item Unit Cost

1. Common excavation125, 000 cubic yards @ $1.00/cubic yard125, 000
2. Compacted earth fill400, 000 cubic yards @ $1.70/cubic yard680, 000
3. Concrete in structure2, 000 cubic yards @ $200/cu.yd.400,000
4. Reinforcement260, 000 pound @ $0.50/pound130, 000
5. Drains8601inearfeet@ $15/linearfoot12, 900
6. Waterstops1, 032 linear feet @ $8/linear foot8, 256
7. Dowels400pounds@ $Vpound800
8. Riprap2, 500 cubic yards @ $25/cubic yard62, 500
9. Filter sand and gravel4, 000 cubic yards @ $10/cubic yard10, 000
10. Gravel 4,000 cubic yards @ $10/cubic yard40, 000
11. Fence lump sum 2,000
12. Mobilization and preparatory work lump sum30, 000
13. Contract supervision 25 work months @ $3, 00075,000

|Subtotal Estimated Construction Costs$ 1,576,456

Additional Costs

Administrative and cultural clearance and mitigation 400,000

Estimated Total Cost $ 1,975,456.00

PROJECT DESCRIPTION: San Simon Watershed Assessment and Restoration Plan, FY 2002 Budget Justification

The Upper Gila River Watershed in Arizona is one of the most important watersheds in the nation and was identified by the Secretary as one of the 12 showcase watersheds in the nation under the Clean Water Action Plan. The San Simon is part of the Upper Gila River Watershed and has been identified by the Community Based Watershed Group (San Carlos/Safford/Duncan Watershed Group SSD) as an important sub-watershed to evaluate. This effort was identified as one of the top ten watersheds in need of restoration by the BLM in FY 2201 and was allocated $245K in the FY2001 Planning Target Allocation Directives. However, prior to final budget approval the majority of the funding was revoked.

The Safford Field Office administers about 750,000 acres in the watershed. The primary objective is to improve water quality by decreasing silt load and salt load, from the San Simon watershed, entering into the Gila River. There is a present need to evaluate past restoration work, using a scientific approach, to determine its effectiveness and evaluate resource conditions of the San Simon. A detailed resource inventory and assessment must be completed on which to base the future planning effort.

The San Simon River was incised early in the 20th century. In an attempt to stop this incision, slow sediment delivery, and restore the river channel, grade control structures have been installed on the San Simon River and its tributaries, which was a multi-million dollar effort. Structures are numerous and include at least 19 major detention dams, several dikes and several earth structures which are miles in length. These all require assessment to determine effectiveness and condition of the structure for repair/maintenance. Determining the effectiveness of the watershed restoration efforts in the past 70 years on the San Simon is critical to any future planning effort. The Safford Field Office proposes to complete an entire assessment of the San Simon River watershed as a prerequisite to a community based planning effort the would set the direction for management of the watershed in the future.

Primary land uses within the San Simon Watershed include; Recreation, a Designated off Highway Vehicle use area, farming and livestock grazing,

This effort would be conducted in three phases:

Phase I: Geomorphic and Engineering Analysis of the Channel

1. Are the existing structures effective?

A.)Are the structures hydraulically and geomorphically effective?

B.)Based upon their hydraulic and geomorphic effectiveness, is maintenance of the existing structures cost-effective.

2. Based upon the status and effectiveness of the existing structures, would additional structures

hasten the restoration of the river and tributary channels and aid in the recovery of the watershed?
3. This study will provide the scientific and engineering information necessary for making future management decisions for the San Simon River and major tributaries.

Phase II: Resources Inventory and Assessment of the uplands and the San Simon channel

In addition to the Geomorphic and Engineering Analysis, the SFO feels there is additional information needed to complete the watershed assessment. They include:
1. Inventory of existing grade control structures, dikes and dams.
2. Road Inventory
3. Develop data base of historic photos, research and documents on the San Simon
4. Ecological Site Inventory
5. Complete cultural resource inventory
6. Complete stream and riparian inventory
7. Complete a threatened and endangered species habitat inventory
8. Avian corridor inventory and other wildlife inventories
9. Complete Standard and Guidelines evaluation and Rangeland Monitoring
10. Complete Paleontology inventory
11. Develop a GIS Database

Phase III: Community Based Partnership

As part of this phase a community based partnership training would be offered to the community. This would allow for a coordinated and interdisciplinary planning effort. This effort is necessary to allow the community to partake in planning for the management goals and objectives for the watershed and development implementation actions necessary to achieve them.

Project goals are:

1. The determination of effectiveness of 70 years of watershed restoration efforts
2. Determine the status of the San Simon Watershed, both uplands and channel
3. Proper inventory, evaluation and assessment of all resources.
4. Management of threatened and endangered and special status species
5. Identifying long-term uses and management opportunities and goals for the watershed and its natural resources

Benefits:

The benefits of the assessment would be the determination of the overall effectiveness of the past 70 years of restoration work and identify where we need to focus restoration efforts to improve and restore the watershed condition for our community based planning effort. Specifically, we would be able to characterize the environmental changes over the last 70 years and assess probable causes and consequences of changes to base our planning effort on.

The affect of the uplands on the water quality in the Gila River has been an issue for many years. There are three threatened and endangered fish species in the Gila River and tributaries, including the spikedace, razorback sucker, and loach minnow. There are two threatened and endangered birds species, the cactus ferruginous pigmy owl and southwestern willow flycatcher are also found along the Gila River and possibly some tributaries. In the uplands of the San Simon there is the lesser long-nose bat. Section 7 consultation is complete on all species for the Safford Field Office Resource Management Plan and the grazing program. Upon completion of the community based watershed plan there may be a need to re-consult.

Water quality and quantity have been a long-standing issue on the Upper Gila Watershed, with on-going litigation over both subjects. The Clean Water Act placed the responsibility upon the states to implement many portions of the Act including reduction in non-point source pollution. The Clean Water Action Plan has directed agencies to take a holistic management approach to improving the water resources. This effort is being made through the Gila Watershed Partnership on the Arizona portion of the Upper Gila Watershed and through the Grant County Soil and Water District in New Mexico and other groups in New Mexico. This effort was initiated in 1993 and is a community-based effort that has wide local and national support.

Public lands in the San Simon Watershed contribute substantially to silt load entering into the Gila River and into the San Carlos Reservoir. During the 1930's the US Geological Survey estimated as much as 30% of the silt load entering into the San Carlos Reservoir came from the San Simon watershed. Over the years the watershed has improved but is still a highly eroding area. Much of the watershed of the Gila River is on public lands; effective management will require a joint effort from both public and private lands.

Budget and personnel constraints have prevented the bureau from doing a proper assessment and planning for the watershed. Another major concern is the inability to do proper maintenance on roads and existing structures that affect watershed function. Without proper maintenance these contribute to soil erosion and deterioration of water quality in the Gila River. Roads need to be inventoried and classified and their contribution to sediment monitored. Future conservation work and management needs to take place within the watershed in order to be in compliance with parts of the Clean Water Act.

JUSTIFICATION:

FY 2002:

1. Inventory of existing grade control structures, dikes and dams. Starting in 1930 the CCC, Soil Erosion Service, SCS, BLM and private parties began construction a variety of structures in the San Simon Watershed. There has never been a complete inventory of these structures. During 2002 funded impart of deferred maintenance funding these structures will be inventoried. (Completed FY02)

FY 2003:

1. Orthophotography and Digital Elevation Model of San Simon Channel – Scheduled to be completed as part of an existing project with existing funds.

2. Road Inventory- Roads are suspected to be a major contributing factor to sediment loading directly into the San Simon Channel and indirectly into the Gila River which supports 3 T&E fish species and one T&E bird species. Roads also contribute to surface erosion factors which contribute to the deterioration of numerous cultural resources. This effort is being funded through a state-wide grant from AZ State Parks OHV - $45,000 for SFO.

3. Initiate a threatened and endangered species habitat inventory - Black-tailed Prairie Dog and Apolmado Falcon Cost = $30,000. (Funded in 1150)

4. University of Arizona - Office of Arid Land Studies. - Continue course series began in the fall of 2001 that explores aspects of resource use and management in arid land ecosystems. It focuses on the drivers and consequences of management interventions, coupled with natural environmental change.

5. Initiate Paleontology inventory - World class pale ontological resources have been found at the 3,000 foot elevation level. Excavations are on going and efforts have been coordinated with the Mesa Museum. These resources have included glyptodonts, tortoises, and bears. These resources may be extensive, and there is a need to do a complete inventory. Funded FY 03

6. Initiate Photo and historic document data base (partially funded through left over grant dollars $4K)

FY 2004:

1. Initiate Geomorphic and engineering analysis of the San Simon River and Tributaries a two year process. (See BOR proposal) Initiate Task 3 and 4. (270K)

2. Initiate Examination of 120 years of Environmental Changes and Efforts to control Them, University of Arizona, Office of Arid Lands Studies proposal. Two year process (See attached proposal) Initiate Task 5.1, 5.2, 5.3 (See UofA proposal) (214K).

3. Develop GIS, Data Analysis, and Information Technologies for Accessing Resources of the San Simon Watershed (See UofA proposal) (103K)

4. Initiate PHD dissertation by Kelly Altenhofen (30 K, See attached Proposal)

5. Complete Photo and document data base (10k)

6. Retake selected photos

7. Other Tasks, In addition to the Geomorphic and Engineering Analysis, the SFO feels

there is additional information needed to complete the watershed assessment which would require a two-year effort.

a. Ecological Site Inventory - This effort is in direct support of Arizona Standards for Rangeland Health. It provides an inventory of ecological sites based on soil and vegetation. This inventory will serve all resource disciplines by providing ecological status for DPC objectives. This inventory is being developed for GIS format and will fulfill BLM Geospatial Metadata standards. This is part of a coordinated effort with the Coronado National forest and the University of Arizona. Cost = $80,000

b. Initiate cultural resource inventory- A Class II cultural resource inventory would be completed covering the San Simon Valley. Sample units would be selected along the eroded San Simon channel and major tributaries to inventory at the Class III (intensive) level. An ethno ecology study would be completed by contract for the San Simon watershed. The study would consist of library/archival research and informant interviews to collect information on: the watersheds past environment; historic and present land uses; changes in the environment resulting from these uses; the areas present environment; and recommendations for management. Cost = $115,000.

c. Initiate stream and riparian inventory- Research and develop inventory methods for ephemeral drainages. This will be done in coordination with a State-wide effort in Arizona, partnering with USFS and the National Riparian Team. Cost = $10,000.

d. Avian corridor inventory and other wildlife inventories – Initiate inventory of avian species within the San Simon watershed. This area appears to function as a sky island corridor connecting mountain ranges in Mexico with the Gila River. Cost = $22,000.

e. Continue Standard and Guidelines evaluation and Rangeland Monitoring - AZ Standards for Rangeland Health Evaluations within the San Simon watershed. This effort will consist of monitoring indicators of rangeland health to determine if allotments within the watershed are meeting the Arizona rangeland health standards. This is part of a coordinated effort with the University of Arizona and the Coronado National Forest. Cost = $25,000

f. Internal GIS support to digitized resource data into database Cost = $5,000

g. Project coordinator - Overseas administration of all resource inventory contracts throughout the assessment and planning efforts for the San Simon Watershed. The Contract Administrator would assures product review is performed by all BLM, BOR and UofA specialists, assure quality control, and tracks scope of work, time tables and budget. Cost = $20,000

FY 2005:

1. Complete Geomorphic and engineering analysis of the San Simon River and Tributaries.

2. Complete Examination of 120 years of Environmental Changes and Efforts to control Them, University of Arizona, Office of Arid Lands Studies proposal. Two year process (See attached proposal) Initiate Task 5.4, 5.5 ($140K)

3. Other Tasks

a. Ecological Site Inventory - This effort is in direct support of Arizona Standards for

Rangeland Health. It provides an inventory of ecological sites based on soil and vegetation. This inventory will serve all resource disciplines by providing ecological status for DPC objectives. This inventory is being developed for GIS format and will fulfill BLM Geospatial Metadata standards. This is part of a coordinated effort with the Coronado National forest and the University of Arizona. Cost = $80,000

b. Complete cultural resource inventory - A Class II cultural resource inventory would be completed covering the San Simon Valley. Cost = $75,000

c. Stream and Riparian Inventory - Research and develop inventory methods for ephemeral drainages. This will be done in coordination with a State-wide effort in Arizona, partnering with USFS and the National Riparian Team. Cost = $10,000.

D. Avian Corridor Inventory - Complete inventory of avian species within the San Simon watershed. This area appears to function as a sky island corridor connecting mountain ranges in Mexico with the Gila River. Cost = $22,000.

e. Internal GIS support to digitized resource data into database - $5,000

f. Project Coordinator - Overseas administration of all resource inventory contracts throughout the assessment and planning efforts for the San Simon Watershed. The Contract Administrator would assures product review is performed by all BLM and BOR specialists, assure quality control, and tracks scope of work, time tables and budget. This coordinator would also assist with efforts of the Gila Watershed Partnership. Cost = $20,000.

G. San Simon Watershed Assessment - Assimilation of resource inventory reports and results of geomorphic studies. Complete all data digitizing into GIS, report preparation and publishing. Cost = $10,000

FY 2006: At this point, inventory and assessment of the structures will have been completed. Resource inventories will be complete enough to begin forming analyses and interpretation. There will be a big picture to look at with fragmented resource inventories in place. It is now time to form the official community based partnership and work group to look at the big picture, and discuss the social/political questions provided by the restoration effort. The planning effort would be finalized by end of fiscal year 2006.

1. Community Based Partnership - Provide training locally to interested public for development of a watershed plan. Identify committed participants for the planning effort. $6,000

2. Project Coordinator - Once the Watershed Assessment contracts are completed, the project coordinator would assist the BLM field office planner with the community-based planning effort. This coordinator would also assist with efforts of the Gila Watershed Partnership. Cost = $20,000

FY 2007:

1. San Simon Watershed Plan - plan development and printing. Cost - $5,000

2. Project Coordinator - Once the Watershed Assessment contracts are completed, the project coordinator would assist the BLM field office planner with the community-based planning effort. This coordinator would also assist with efforts of the Gila Watershed

Partnership. Cost = $20,000

PARTNERSHIPS:

The Gila Watershed Partnership has many on-going projects which focus on public and private lands. Many cooperators participate. The partnership has currently a grant proposal forward to EPA by the Arizona Governor under the Watershed Initiative. The Upper Gila Watershed is one of three watersheds in Arizona funded to develop a NEMO process on and it is being done by University of Arizona, Extension Service, funded by AZDEQ. Other ongoing activities and completed projects are funded come through:

1. Arizona Water Protection Fund ($500,000.00 grant)
2. Bureau of Reclamation ($500,000.00 grant)
3. University of Arizona ($150,000.00 through in-kind service)
4. Arizona Department of Environmental Quality, 319 grants for various projects ($100,000.00)
5. Arizona Department of Water Resources various grants ($78,000.00 grants)
6. Gila Watershed Partnership made the final list for the Watershed Initiative in FY 03, but was not selected. EPA has request they resubmit in FY 04 with amendments.
7. Watershed Affiliates ($200,000.00 through in-kind service). The following list of watershed affiliates that have been contributing to similar projects on the Gila River through the Gila Watershed Partnership. The San Simon discharges into the Gila River and the San Simon project is of great interest to the Gila Watershed Partnership. The affiliates include: Gila Valley NRCD; Farm Bureau; Phelps Dodge Mining Company; Arizona Cattle Growers; Gila Valley Irrigation District; Franklin Irrigation District; Graham and Greenlee County Boards of Supervisors; City Councils of Safford, Thatcher, Pima; Chambers of Commerce of Safford, Thatcher and Pima; The Nature Conservancy; San Carlos Apache Tribe; Natural Resource Conservation Districts; Federal agencies including Bureau of Reclamation, Environmental Protection Agency, US Forest Service, US Fish and Wildlife Service; State agencies including Arizona Game and Fish Department, Arizona Geological Survey, Arizona Department of Environmental Quality, Eastern Arizona College, University of Arizona, Office of Arid Lands Studies and Extension Service; and a variety of private citizens.

Funding:
FY'03 = 100,000
FY'04 = 864,000
FY'05 = 362,000
FY'06 = 31,000
FY'07 = 30,000

Workload Measures

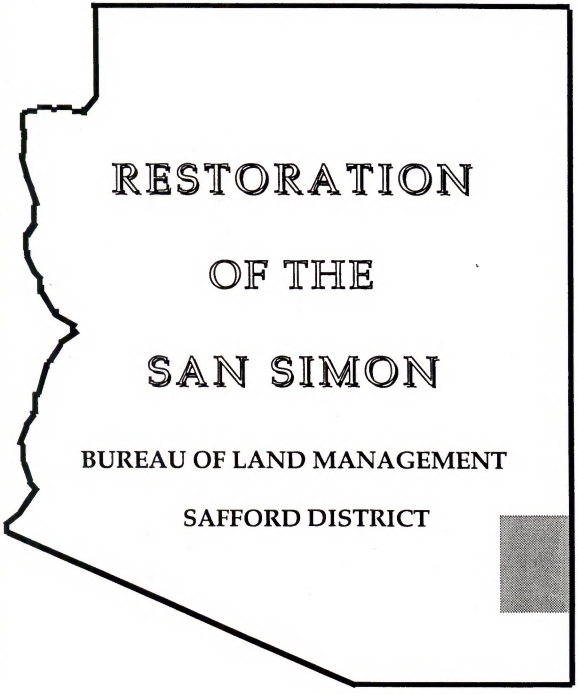
FY	Subactivity Measure	Workload Measure	Workload Unit	Requested Amount

2004	1010	BP	50,000	$270,000 (Geo & Engineering Analysis)
2004	1010	CA	500,000	$214,000 (UofA Assessment)
2004	1010	CA	500,000	$103,000 (U of A GIS)
2004	1010	CA	500,000	$25,000 (Contract Administration)
2004	1020	BQ	250,000	$80,000 (ESI)
2004	1020	MJ	20	$25,000 (S&G and Monitoring)
2004	1040	BV	60	$10,000 (Stream/Rip Inventory/Monitoring)
2004	1050	BC	50,000	$115,000 (Cultural)
2004	1110	CB	2,000	$22,000 (Avian Corridor Inventory)
2005	1010	CA	200,000	$150,000 (UofA Assessment)
2005	1010	Ca	200,000	$25,000 (Contract Administration)
2005	1020	BQ	250,000	$80,000 (ESI)
2005	1040	BV	60	$10,000 (Stream/Riparian Inventory/Monitoring)
2005	1050	BC	40,000	$75,000 (Cultural)
2005	1110	CB	2,000	$22,000 (Avian Corridor Inventory)
2006	1010	CA	700,000	$25,000 (Contract Administrator)
2006	1610	DF	1	$6,000 (Community Based Partnership Train)
2007	1010	CA	700,000	$25,000 (Oversee plan development)
2007	1610	DF	1	$5,000 (complete plan)

Grazing Allotments in San Simon Watershed (BLM)

Allot. #	Allotment Name	Public Acres	State Acres	Private Acres	Public Aum	St Aum	Pri Aum	Past	Mangt. Cat.
5101	Cresote	15210	1920	1000	936	144	48	5	m
5102	Munson Cienega	3080	1753	791	150	100	100	1	m
5103	111	79774	248	130	4380		12	10	m
5181	Hackberry	4434	73042		420	5472		5	c
5104	Chimney	6100		640	170		48	4	I
5105	Ash Peak	12145		640	962		144	5	I
5108	Tanque	66769		640	2079		24	5	m
5109	Van Guasig	10060		640	612		60	5	I
5110	Badger Den	47147		1080	1776		52	8	I
5179	Willow	6290			E			1	
5113	Slickrock	26117			1356			7	I
5114	Fan	8510			1200			5	m
5116	Midway Canyon	4910		1420	387		237	5	I
5115	Joy Valley	61690		2140	3458		142	9	m
5118	Murshison	49947	4184	1510	3120	156	84	6	m
5165	Small	3840		1640	E			1	C
5119	Flying W	3840		1640	432		168	3	I
5124	San Simon	530		320	36			1	c
5125	Rooster-Comb	33319		320	2160		24	6	I
5136	Oil Well	2240	1920	200	104	45	62	1	c

5138	Vanar	17866	300	200	432	27	12	3	m
5142	Nine Mile	930		630	36			1	c
5143	Silver Strike	3730	1475	3720	559	60	540	3	m
5134	Emigrant Canyon	240	17321	3720	12			2	c
5144	Apache Springs	4365		680	924		126	2	m
5150	Whitetail	7360	2640	65	336	264	3	4	I
5151	Clayton	3198		640	190		48	3	m
5152	Brushy Canyon	4200	2000	610	150	76	65	3	I
5154	Haystack	710	4240	550	16	76	29	3	c
5155	Nippers	2300	2200	600	144	72	72	2	I
5156	Oak Creek	2240	160	420	75	12	34	2	I
5157	Midway	2510	3120		84	165		2	m
5158	Paradise	823	5296	6623	168	600	700	1	c
5160	Cave Creek	720	7061		36	705		1	c
5161	Rodeo River	640			36			3	c
5176	Royce	120						1	c
5123	Saltbush	40		300	12			1	c
5129	East Canyon	1650		100	204		8	1	I
5130	Cement	1309		1018	306		78	1	I



RESTORATION

OF THE

SAN SIMON

BUREAU OF LAND MANAGEMENT

SAFFORD DISTRICT

RESTORATION OF THE SAN SIMON

Background

Location

The San Simon River originates along the Arizona-New Mexico state line about 12 miles north of the United States-Mexico international boundary. It flows in a northwesterly direction for about 100 miles and empties into the Gila River near Safford, Arizona. The average slope of the drainage is between 0.2 and 0.3 percent (0.2 to 0.3 feet loss of elevation per 100 feet of horizontal distance). The San Simon produces an average of 8,550 acre-feet of water per year. Suspended sediment in San Simon waters as they leave the watershed varies widely, from a low of about 3,000 parts per million to a high of over 180,000 parts per million.

Acreage/Land Status

The watershed covers about 1,966 square miles (1,258,690 acres) or 5,092 square kilometers (509,200 hectares). The Bureau of Land Management manages 49.8 percent of the watershed, while private lands account for 24.9 percent, 15.3 percent are state lands (Arizona and New Mexico), 9.8 percent are managed by the United State Forest Service, and the remaining 0.1 percent is managed by the National Park Service.

Elevation

Watershed elevations range from about 2,900 feet above sea level at the river's mouth to 9,800 feet in the Chiricahua Mountains on the southern end of the watershed. Most of the 626,909 acres of the land managed by the BLM are below 5,000 feet in elevation and are generally situated on the downstream half of the watershed.

Climate

The San Simon watershed is semi-arid for most of its area. Precipitation varies from about 8 inches on the northern (low elevation) end to over 20 inches in the Chiricahua Mountains. About 60 percent of the rainfall occurs during the 6 hottest months, usually as high intensity, localized thunderstorms. The remaining forty percent of the precipitation, received in the cooler months, generally occurs as relatively gentle, widespread rains. Snow is received on the watershed each year. At the lower elevations, it generally covers the ground for less than 12 hours and at the higher elevations, may remain for 5 to 6 months. Temperatures are relatively mild on the BLM-administered lands with seasonal extremes ranging from slightly over 100 degrees for summer highs to around 10 degrees for winter lows. The frost-free season on the lower part of the watershed in 190 to 210 days.

Historical Watershed Conditions

Historical mention of the San Simon Valley in the early 1800s gives conflicting pictures of the nature of the valley. Will C. Barnes, an Arizona pioneer, cattleman, cavalryman, and Congressional Medal of Honor winner, who visited the valley in the early 1880s, remembered it as a grassy, well-watered area about 60 miles long and 40 miles wide. He remembered the stream as being intermittent, with cottonwoods and willow thickets along its banks. An 1879 map of southeastern Arizona marks the San Simon as the "Rio de Sauz" or River of Willows and illustrates the stream as being underground for much of its course.

Parke, in 1854, described the stream as having no trees or bushes to indicate the course of the stream. The surrounding valley was vegetated by creosote bush, saltbush, and yucca with grass being scarce. Hutton, in 1859, described the San Simon as being intermittent and flowing for about six months of the year.

Historical research and scientific knowledge of soils, climate, and vegetation leads one to believe that the San Simon Valley was a broad grassy plain bisected by an intermittent stream with little apparent erosion. The broader, flatter areas were probably covered by sacaton and tobosa grass with few tress. Some willows may have grown in the wetter areas and cottonwoods were certainly present at San Simon Cienega, near the Arizona-New Mexico state line. There is little evidence that the stream flowed on a perennial basis. It is fairly certain that little channel erosion was present and the bottom was well vegetated. Early cattlemen have described the valley as a sea of grass with unlimited potential for raising livestock.

By 1919, the San Simon was recognized in U.S. Senate Document 436 as needing extensive restoration. From 1883 to 1916, in the short span of 33 years, headcutting (gullying) of the San Simon advanced some 60 miles up the channel and ranged from 10 to 30 feet deep and 40 to 800 feet wide.

What happened in a mere 33 years to change a grassy bottomland into a series of deep gullies with almost no vegetation? Several theories have been proposed. The most widely espoused proposal is that overgrazing initiated changes in vegetation and runoff patterns. Some researchers have given more credence to a combination of man's discrete activities, such as development of wagon roads, building railroads, and alteration of stream channels. Another hypothesis is that the erosion was geological, caused by the earthquake in northern Sonora in 1887, and the land is trying to regain equilibrium. A third theory places blame on climatic change with minor changes in rainfall patterns and frequencies initiating the erosional sequence. Cooke and Reeves, in their book "Arroyo and Environmental Change in the American Southwest" (1975), have proposed that each of the theories probably had a contribution to the rapid erosional sequence. Cooke and Reeves discount any one action as being solely to blame. They cite similar erosional sequences occurring in New Mexico on the Rio Puerco, in Arizona on the San Pedro and the Santa Cruz, and on several California streams during the same time period.

Discrete actions that contributed to the rapid erosion include:

- overgrazing by livestock in the 1880s (an estimated 50,000 head were grazing in the valley at one time
- extended drought, broken by intense thunderstorms (1890s)
- construction of a drainage ditch from the Gila River up the San Simon Valley in 1883
- development of wagon roads and increased freight use during the early development of copper mines in the area (1880s)
- beginning construction of the Gila Valley, Globe, and Northern Railway (1884)

In 1934, the Soil Erosion Service (later to become the Soil Conservation Service) and the Civilian Conservation Corps (CCC) began numerous erosion control measures on the San Simon watershed. Numerous CCC camps in the area, under both the Soil Erosion Service and the Grazing Service (which later became the Bureau of Land Management) began work on diversion dikes, water spreaders, detention dams, rangeland seedings, and gully plugs. The Grazing Service, in 1949, became the Bureau of Land Management and responsibility for erosion control work on public lands passed to it.

Watershed Management 1940 to the Present

Although serious erosion still exists on the San Simon, progress has been made to heal areas eroded at the turn of the century. From about 1935 to 1940, numerous surveys of erosion were conducted both by the Soil Conservation Service and the Grazing Service, and the first plans to control erosion and begin rehabilitation of the main channel were formulated. At this same time, Civilian Conservation Corps personnel were constructing gully plugs in small washes, building spreader dikes, seeding eroded areas, and constructing facilities to manage livestock on the eroded watershed.

The first major structures on the watershed were constructed in 1940 by the Civilian Conservation Corps. Two dams, Cienega No. 1 and Cienega No. 2, were built near the Arizona-New Mexico state line at the head of active channel erosion to protect the still-existing San Simon Cienega. These dams were drop-type structures designed to prevent further headcutting up the channel and to slow the water as it passed into the eroded portions of the channel.

Goat Well Drop Structure was also built in 1940, on a tributary of the San Simon, Slick Rock Wash. This dam was designed to prevent erosion of the wash and slow waters entering the San Simon, similar to the Cienega dams.

Construction of the San Simon Fan Structure was completed in 1953. Due to a greater than 100-year flood, the structure failed in 1954 and was rebuilt in 1955. This structure was the first detention dam of the mainstream of the San Simon designed to heal the eroded channel. The Cienega dams, built in 1940, were designed simply to stop further headcutting.

The San Simon Fan Structure has succeeded beyond everyone's expectations. The channel has been completely rehabilitated for 44,000 feet above the structure. Evidence that channel refilling is continuing is visible for 10 miles above the structure. In 1990, the area of fill was measured and it was found that the San Simon Fan Structure had trapped 19 million tons of silt since 1955 !

From strictly a mechanical or engineering standpoint, the dam should have affected the channel for only a few thousand feet above it. The planting of grasses and vegetation above the dam as the channel rehabilitated allowed floodwaters to slow down farther and farther upstream and drop their silt load, causing the effects of the dam to be magnified upstream. The Contest Well seeding, in 1968, has been extremely successful. Not only does the vegetation slow the floodwaters and allow silt to drop out, the vegetation provides feed for cattle and habitat for wildlife. The 600-acre seeding provides six-month winter grazing for up to 170 head of cattle. Before construction of the San Simon Fan, only 4 to 6 head of cattle could graze the same area. During the summer months, the seeding is rested and conditions are favorable for a large buildup of rodent populations. In winter, the rodent escape cover is grazed off and the rodents are susceptible to predation by migrating and wintering raptors in the area.

By 1956, seven side channel structures had been completed, including Creighton and HX. In 1957, a "Stop Work Order" was imposed by the Secretary of the Interior due to claims from downstream water users that detention dam construction was reducing amounts of water delivered for irrigation purposes.

The San Simon Community Watershed Plan, completed in 1963, analyzed effects of existing and proposed structures on rehabilitation and effects on water availability for downstream users. Consequently, the "Stop Work Order" was lifted in 1965 when the Secretary was convinced that losses of water to downstream users was minimal compared to the need to control erosion and rehabilitate the San Simon watershed.

Between 1967 and 1972, seven additional side channel structures were completed: Ryan Dam (1967), Ryan Dike (1968), Whitlock Dam (1968), West Doubtful (1969), Cove Dam, "111" Dam, and Sands Draw Dam (1970-72). Several upland seedings were tried during this time period. Due to the erratic nature of the climate, seedings in upland areas have not been successful. Even areas that appeared to be a success for a few years later died out and returned to a pre-treatment state.

From 1972 to 1979, no funding was received for further watershed improvement work in spite of the existence of the approved community watershed plan. The Upper Gila-San Simon Grazing Environmental Impact Statement, finalized in 1979, addressed the need for, and effects of, the proposed Tanque and San Simon Barrier Dams.

A special Congressional appropriation in 1980 authorized the construction of Tanque and San Simon Barrier Dams. The San Simon Barrier Dam was completed in 1980, but a subsequent engineering examination revealed problems with the proposed location of the Tanque Dam. A new site was found upstream and the damsite was renamed the Timber Draw Dam. To date, it has not been built.

The last detention dams built in the San Simon watershed were the Slick Rock Detention Dam (1981) on Slick Rock Wash, a tributary of the San Simon, and Creosote and South Well Detention Dams (1982), also built on tributaries.

The San Simon Barrier Dam, since its completion in 1980, has retained 4 million tons of silt and has totally regraded the channel for 1,900 feet upstream. Effects can be measured as much as 19,700 feet upstream. The flooded, regraded areas behind the dam have been planted with trees and grasses to stabilize the area and provide wildlife habitat. Livestock are excluded from about 300 acres directly behind the dam to allow vegetation to recover. Livestock will be allowed to graze the area after its recovery is complete.

A Coordinated Resource Activity Plan was developed in 1984 to set long-range goals and priorities for all major resources. The plan outlined the positive benefits to watershed, wildlife, recreation, and livestock grazing afforded by the channel rehabilitation. A major recommendation was to establish a vegetation mosaic of 80 percent grasses and 20 percent shrubs and trees in the restored channel to provide maximum benefits for wildlife, watershed and livestock grazing.

It appears, after more than 50 years of observing results from various watershed projects, the most effective treatments are main channel structures. Side channel structures, with the possible exception of the HX Detention Dam, have been ineffective in regrading channels for long distances upstream, mainly due to the slope of the channels. The side channel structures have served to stop further headcutting of channels upstream and they do reduce water velocities and thus reduce sediment transport and erosion. An unplanned side benefit has been the reduction of peak flows from floodwaters. This reduction has undoubtedly protected Solomonville and the private farmland downstream from damaging floods.

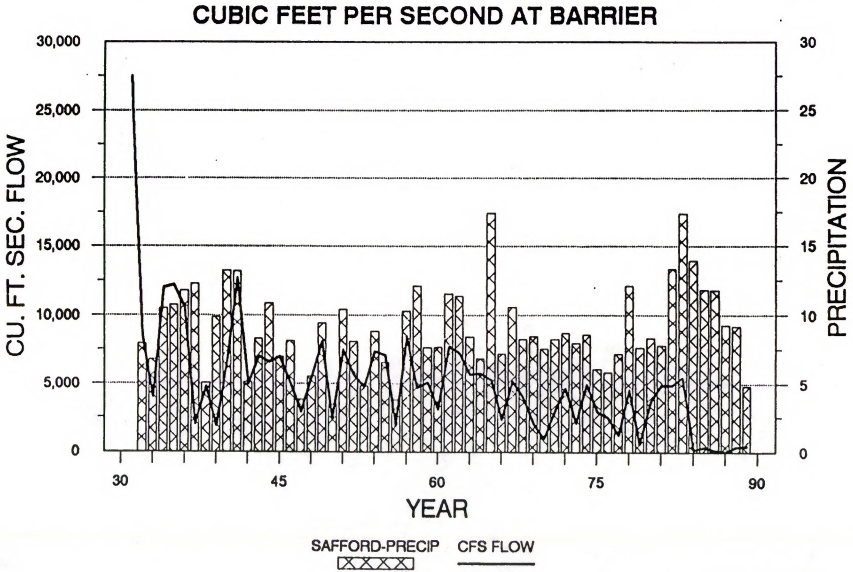
San Simon Watershed Projects

excluding

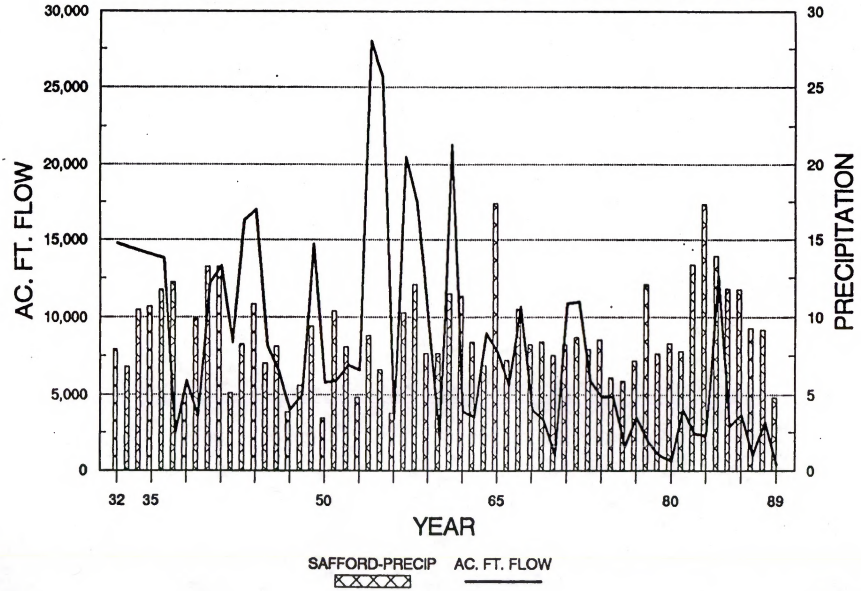
Civilian Conservation Corps Projects

DETENTION DAMS	COST
San Simon Barrier	1,300,000
Slickrock	232,000
San Simon Fan	271,000
Creighton	140,000
South Well and Creosote	133,000
111 Dam and Cove	113,000
Whitlock (abandoned)	193,000
HX Dam	93,500
Sands Draw	70,000
West Doubtful	63,000
Ryan	20,000
Goat Well	13,000
West Olsen	4,000
Halfway	10,000
West Halfway	1,000
Olga	10,000
DIKES	
Olsen	27,000
Reservoir	17,000
Rock House	21,000
Ryan	40,000
SEEDINGS	
Contest Well	5,853
New Well	22,551
Antelope Well	26,297
Ryan	17,264
Ryan Dike	2,717
Timber Draw	13,987
Van Gausig	17,622
WELLS	
Construction Well	13,000
Barrier Well	15,000
FENCING	
Estimated cost for all fencing, includes around seedings, exclosures, etc.	50,000
total	$2,955,291

PEAK FLOWS OF SAN SIMON RIVER



SAN SIMON ANNUAL FLOW AND PRECIPITATION



SAN SIMON VALLEY TOUR

Stop 1. San Simon Barrier Structure

Built in 1980 by BLM for erosion control and watershed rehabilitation of the San Simon Valley, the cost was $1,300,000. The structure contains 224,000 cubic yards of compacted earth fill and 2,684 cubic yards of reinforced concrete requiring 313,000 pounds of steel.

Within the first two years, the channel silted in to the level of the spillway (17 feet). To date, the channel has been completely regraded for 1,900 feet upstream and effects of the structure can be measured for 19,700 feet upstream. The dam has trapped, as of 1989, over 4 million tons of silt. Although not specifically designed for flood control, this dam and other dams on the watershed reduce peak flows and protect the town of Solomonville and nearby farmland.

Starting in 1982 and continuing almost yearly, about 500 cottonwoods and willows have been planted within the floodplain with a 50 percent survival rate. In 1983, about 30 acres were root-plowed, disked, and seeded to replace invading seep willows and salt cedar with more desirable species. The goal is to eventually have the floodplain exhibit a mosaic of about 80 percent grasses and 20 percent riparian trees and shrubs. The rehabilitated area (about 300 acres) is presently excluded from livestock grazing and provides excellent habitat for mule deer, javelina, dove, and quail.

Stop 2. Halfway Detention Dam

This dam was originally built in 1938 by Civilian Conservation Corps with technical assistance from the Soil Conservation Service. It washed out in the 1983 flood. During recent reconstruction, the design of the drop structure was changed to be similar to the Barrier Structure.

Stop 3. Goat Well Drop Structure

The Civilian Conservation Corps, with technical assistance from the Soil Conservation Service, built this structure in 1940 to stop headcutting up Slick Rock Wash. This area is typical of the highly erodible soil conditions present on much of the San Simon watershed. The Goat Well structure has effectively stopped headcutting up the Slick Rock floodplain. Perennial grasses and mesquite tress thrive on the flooded area on the upstream side of the dike.

Stop 4. Timber Draw Site

Proposed site of the Timber Draw Detention Dam. This dam, the last major structure proposed on the San Simon River, is expected to cost about two million dollars. The structure will consist of 400,000 cubic yards of compacted earth fill and 2,100 cubic yards of reinforced concrete. It will be about one mile long and the average height will be about 30 feet. The drop structure will be 110 feet wide and will allow the water to drop 31 feet.

Stop 5. Hot Well Off-Highway Vehicle Area

Hot Well, an artesian well, was drilled in 1928 an as oil exploration well. Though no oil was found, the artesian water flows at about 300 gallons per minute. The water is warm (105 degrees) and is high in sodium but low in soluble salts. The water was used for farming for several years, until the soil became sodium affected.

This section was acquired by BLM through exchange with the State of Arizona. The draft Safford District Resource Management Plan proposes to develop the area as an open Off-Highway Vehicle (OHV) use area to accommodate OHV enthusiasts already using the area. People come from Safford, Tucson, Willcox, Phoenix, and California to play on the sand dunes. The area has great potential for the development of wildlife habitat and wetland areas.

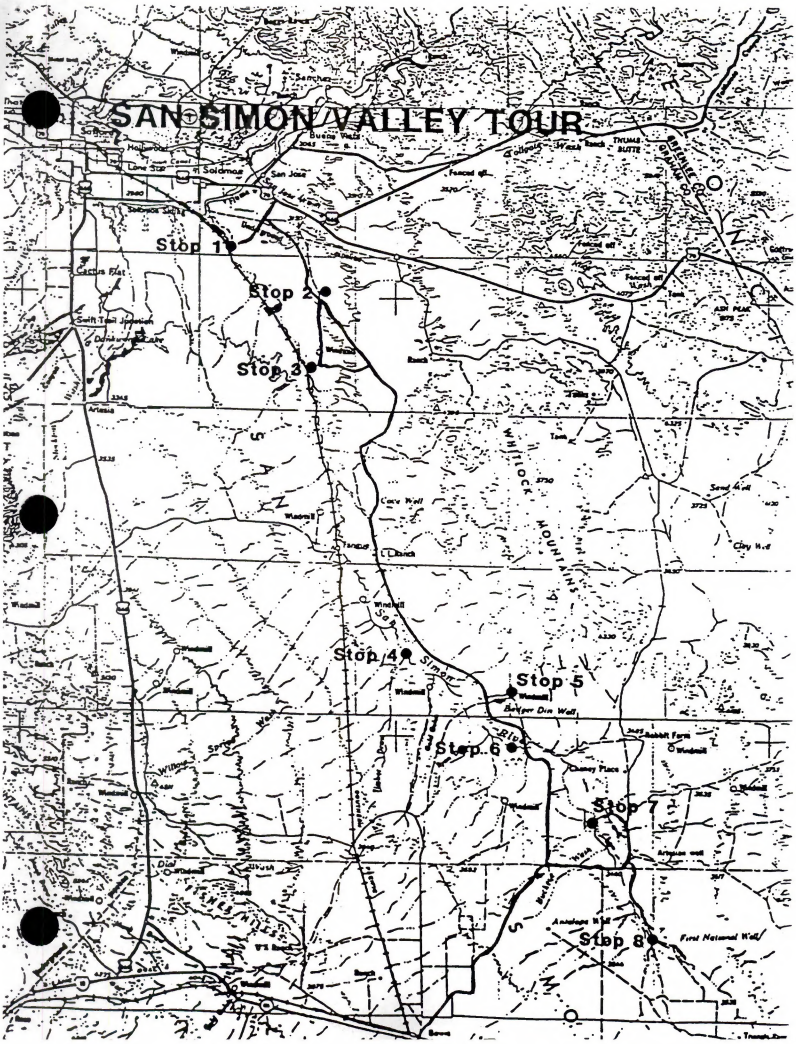
Stop 6. Ryan Dikes and Seeding

These dikes were constructed in the mid-1960s to prevent headcutting on the side channels of the San Simon River and to spread water on terraces for revegetation. The dikes have drawdown tubes at intervals to let water enter the San Simon River. Portions of these dikes were breached during the 1983 floods, and funds have not been available to fix them.

Stop 7. San Simon Fan Structure

The Fan Structure was built in 1953 by the Soil Conservation Service. It washed out in 1954 and was rebuilt in 1955. As a result of the structure, the channel has been regraded for about 10 miles upstream. Studies completed in 1989 revealed that the structure had trapped 19 million tons of silt since its completion. The area is included in an allotment management plan and the regraded channel is capable of supporting about 150 head of cattle per section for six months.

The goal is to establish a mixture of 80 percent grasses and 20 percent trees and shrubs to maximize watershed protection, livestock production, and wildlife habitat. The area contains several sites that have been developed exclusively for wildlife use.


SAN SIMON VALLEY TOUR
Stop 1
Stop 2
Stop 3
Stop 4
Stop 5
Stop 6
Stop 7
Stop 8
WHITLOCK MOUNTAINS
PINALEÑO MTS.

Ranch Histories of the San Simon Valley

History of the Triangle Ranch

Introduction

The Triangle Ranch was one of the large and prominent cattle operations within the San Simon Valley. Much of its former land holdings and grazing pastures served as important components of the federal governments attempt to revegetate the San Simon Valley. It is worth noting the history of the ranch for several reasons. First, the Triangle served as an important commercial operation within the San Simon Valley. It helped shape the future of livestock operations north of the San Simon Cienega. Second, the Triangle outfit left the area with a rich cultural history and several prominent Arizona citizens were involved with its operations. Lastly, it is important to know the boundaries and operations of the Triangle in order to judge the effectiveness of various reclamation efforts that took place within its former boundaries. It is also important to realize that this particular area, which has seen so much reclamation effort, has undergone several phases of "boom and bust" in relation to cattle ranching and grazing. These periods of overgrazing, recovery, drought, and degradation added to the overall decline of the watershed and reduced carrying capacity of this section of the San Simon Valley.

Early Years (1870-1900)

The early history of the Triangle Ranch is tied in closely with that of J.H. Parramore and C. W. "Clabe" Merchant. Parramore and Merchant were both prominent Texas cattlemen who, along with other Texans, had sniffed the coming of the end of the end of the open range in west Texas. Their 7H or San Simon Cattle and Canal Company

began in 1883 with the purchase of several small ranches that had been staked out in late 1870s (Hancock Manuscript, Hayes 1999).

Among the small ranches consolidated were those of John McGill (a former 6th Calvary Soldier from Ft. Bowie), W. A. Stark, Al George, Jesse Roscoe, J. M. Black, W. B Moore, B. F. Black, B. F. Dunn, Tom Whitehead and J. C. "Judge" Hancock. J. W. The ranch of Nick Hughes (*Oldest Ranch on the San Simon* 1947) was also absorbed. Hughes reportedly built a fort-like ranch home two and a half miles east from the "old stage station in the San Simon Valley" in 1878 (ibid.). Hall, a Texas cattleman served as the front man for the purchases. Several other ranchers held out and refused to sell to the Texas interests. Most notably of the group was J. A. "Gus" Chenowith on the upper end of the San Simon Cienega, Arnett on the lower end of the Cienega, the Keating brothers located in the canyons near Cochise Head (San Simon Head), and Bill Shanahan in Whitetail Canyon.

The Keating brothers ranching days were cut short by double tragedies. Apache raiders beat Michael Keating to death in 1886 and John was shot in the back by a cowboy named Dick Dickey in November 1888 near Stein's Pass (Bailey 1994). Though stiffened in the spine by a precariously lodged bullet, John was able to leave behind his cowboy past and become a successful partner in Lemuel Shattuck's St. Louis Beer Hall located on Brewery Gulch in Bisbee. The two former cowboys had much in common. Both had grown up in the saddle, working cattle in southeastern Arizona. Keating ranch in the San Simon and Lemuel was half-brother of Enoch and Jonas, founders of the Erie Cattle Company located in the Sulphur Springs Valley. He traded in his spurs for hard

rock mining, adobe brick making, and saloon keeping. The two men remained partners and friends until Keating's death in 1903 (Bailey 1994).

The ranch of George Turner may have been absorbed into Parramore and Merchant's operation as Turner and his partner, Galeyville butcher John McAllister, were killed by vaqueros in Sonora, Mexico as they tried to drive an "unattended" herd northward into Arizona Territory. The Turner Ranch was located approximately along the San Simon River near where the present-day Portal-San Simon road crosses it (Hayes 1999)

The consolidation of these ranches gave Parramore and Merchant almost unlimited access to grazing lands stretching from the lower San Simon Cienega northwards to the base of the Whitlock Mountains. According to Hancock (AZHS MS 325), the San Simon Valley at this time had "never been grazed except by deer and antelope." Parramore and Merchant began to ship cattle on the Southern Pacific railroad into the San Simon Station in 1883. The cattle were then driven from San Simon to the Cienega. The bulk of the H's cattle probably grazed in and around the San Simon Cienega and in canyons of the Chiricahua Mountains, but it is conceivable that some drifted northward towards the area that the Triangle Ranch later controlled.

Beginning of the Triangle Ranch: The Ruch Brothers (1884-1914)

In late 1884 or early 1885, Parramore and Merchant were challenged at the north end of their range when the three Ruch brothers laid claim to the lower end of the San Simon Valley (Hayes 1999). The brothers established their headquarters on the west side of the San Simon River approximately 5 miles northwest of San Simon Station. The

brothers laid claim to San Simon range territory directly north of the Southern Pacific Railroad and running to the base of the Whitlock Mountains (Hayes 1999).

The Southern Pacific Railroad was not yet fenced, nor was the divide of the San Simon and San Bernadino watersheds. It was not unusual for Triangle cattle to drift south into the north end of the Chiricahuas or for 7H cattle to wander up north of the tracks in search of grass (Hayes 1999). When the big cattle outfits planned on branding calves, each local cattle operation would send a "Rep" to insure that their stray cattle and associated calves got "burned" with the brand of the owner's ranch. It would have been customary for the Ruch brothers to invite or alert Parramore on the Cienega that they were planning to gather cattle from the slopes of the Peloncillos so that an "H" Rep could be present to watch out for the San Simon Company's interests (Ibid.).

Some confusion exists as to the location of the original Triangle Ranch Headquarters. The original ranch house may have been located east of the present-day Triangle Ranch house remains. Several different sources (Barnes 2003, Hayes 1999, Moore 1965) place the original ranch headquarters in different locations. Dan Moore (1965), an Arizona cowboy and veteran of WWI, describes the headquarters location circa 1921 as "about two miles north of San Simon in northeastern Cochise County." In an earlier chapter of his book "Log of a Twentieth Century Cowboy" Moore writes:

> At San Simon, a little cow town out in the middle of the valley of the same name, I bought a few things I needed and rode off north to the old Triangle Ranch. It belonged to old General McKenzie who had come to Southeastern Arizona as a calvary officer when the army was trying to round up the fierce Apache raiding

parties which were killing and plundering this southeast part of the territory in the 1880's.

Moore may have been referring to the old McKenzie Ranch, which is located in the Peloncillo Mountains and northeast of the present-day Triangle Ranch house. The name "Old McKenzie Ranch" still appeared on the 1950 San Simon Quadrangle Map (15-minute Series Topographical) near the peak of the same name. The map in Moore's book (prepared by Bill Young) places the Triangle Ranch headquarters almost exactly where the Old McKenzie Ranch was located. The confusion with McKenzie will become apparent shortly as the history of the ranch progressed to his ownership.

Ed Barnes, longtime San Simon area rancher, stated that the original Triangle house was located closer to the San Simon River than the present structure. It would be hard to argue against an earlier structure having been totally erased from the general area, given the fickle and potentially violent nature of the San Simon's erratic discharge and the high degree of erosion present along the main channel. As another lifelong area resident pointed out, early ranch houses were certainly not on a par with the Victorian styled houses of Texas and Kansas cattle barons of the same era. In many cases the headquarters consisted of little more than a shack constructed of rude timbers "liberated" from the local railroad, with an equally expedient corral of wire and assorted wood debris located nearby. Access to water was exceedingly more important, and this access, coupled with an improved road network, probably led to the construction of the Triangle house at its present location.

Alden Hayes (1999), author of the *Portal to Paradise*, places the Triangle Ranch headquarters "on the west side of the creek [San Simon River] five miles northwest of

San Simon Station." This places the headquarters at the approximate location of the present-day ranch structures. In contrast, the map found in the same book places the Triangle Ranch 10 miles northwest of San Simon, within the traditional range of the Triangle, but quite a distance from the location of the surviving physical structures or the description of Hayes himself. The map serves as testament to the ability of a historical location to shift through the distillation process of professional editing and illustration, thereby leaving the reader with a false geographic impression or an itch on their head.

The story of the original ranch house is either partially solved or made more confusing by the location of a ranch called "Ward and Co." on a Rand McNally Company (Engravers Chicago) Map of Cochise County *circa* 1885-1889 by H. G Howe. Howe was a civil engineer and architect with an office located on Fremont Street in Tombstone in 1880 (Young 1999). The "Ward & Co." ranch is located 6 miles downstream from the intersection of the S. P. R. R. rail lines and the San Simon River near the edge of the west bank. This location would place it very near the remains of the Triangle Ranch house, but along the river, which seems to corroborate the story of Ed Barnes. Several attempts to locate the site have been unsuccessful (Author 2003).

There is little historical information available on the Ruch brothers or the early days of the ranch. It would appear that the Ruch brothers might have been involved in a partnership with H. C. Ward and E. F. Bowers. The names of the two brothers appear on a spring location document recorded on April 30, 1888 (Cochise County Recorder *Location of Springs* Miscellaneous Documents). The location was recorded as "Ward Springs" which was described as being marked with a system of cairns and measured out in "rods." The spring today is located in Sections 29 and 30, Township 13 S., Range 32

E., approximately 41/2 miles northwest of Stein's Peak, in Ward Canyon. The names of Fred and Ernst also appear in the Hancock manuscript (AHS MS 325) and in Cochise County land deed documents. The Ruch brothers may have owned an operated a ranch in Whitetail Canyon on the east slopes of the Chiricahua Mountains in addition to the Triangle Ranch, near the vicinity of Triangle Springs or Canyon (also known as Outlaw Canyon). The brothers branded their cattle with an inverted triangle {∇} brand that is no longer in use today (Moore 1965).

Judge J. C. Hancock tells in his memoir (ibid.) of working on a Triangle roundup in 1892-1893. That was the period of the "big drought" and the Triangle range must have been severely affected. Hancock related the story about the numerous cattle carcasses the located just five miles northwest of the of the main ranch area. This location would place Hancock somewhere in the vicinity of Coyote Well, with the cowboys working cattle back towards the Triangle headquarters.

The "creek" or San Simon River had water in it at this time, but the water was so full of maggots that the cook had to strain it through a barley sack. Hancock stated that the nearest well lay about ten miles away, so the cowboys were forced to "down a few sips." Ben Pague of Hilltop, AZ told Alden Hayes (1999) that he was ten years old at the time of the big drought and he vividly remembered cattle carcasses too numerous to skin. At any rate, the brother's operation must have been devastated. The Ruchs were operating in the tail end of the open range period by this point and the land had definitely seen better times. It is probably at this point where serious erosion began northeast of the Triangle headquarters along the main channel.

Apparently the Ruch brothers, or at least Fred, had passed on by 1901, leaving Anne E. Ruch, Fred's widow, most of the Triangle spread. The last will and testament of Fredrick Ruch was recorded March 22, 1889 (Cochise County Recorder *Will of Fredrick Ruch*, Miscellaneous Documents). In the will Fred leaves "to my beloved Anne Elizabeth Ruch" his estate consisting of a third interest in Tule Wells and Indian Springs, and a one half interest in "Pearl Lake" which was "situated about five miles in a northerly direction from the aforesaid San Simon Station." This may be the mysterious "reservoir" that appears on the H. G. Howe map.

According to the Howe map, the reservoir was located approximately 4 miles downstream from the junction of the of the San Simon River with the S. P. R. R. line. This reservoir would appear to be one of the earliest constructed along the main channel or the earliest "recorded" structure. Control of the water sources described in Fred's will was essential for running any cattle operation within this section of the San Simon Valley. The feuds of future Triangle owners with their neighbors would bear testimony to the importance of these wells and any other "permanent" water sources on this windswept and parched range. In addition to the above properties, Fred also left Anne Ruch a two-thirds interest in the "Triangle Brand," ownership of a portion of the livestock located on the ranch, and other miscellaneous properties (ibid.). The other one-third interest could have belonged to his brother Ernst or H. C. Ward.

Somewhere along the line the widowed Anne Ruch had managed to become aquatinted with Mr. Oscar W. Roberts. Roberts may have owned property close to the Triangle Ranch or at least within the San Simon Valley during this time period. Oscar was born at Lexington, Missouri, on November 25, 1854. He was a son of Confederate

sympathizer Captain Wesley and Mary (McGee) Roberts (Bailey and Chaput 2000). The Roberts family was forced to leave Missouri and ended up in Los Angeles, CA in 1869. Oscar was educated in public schools and at St. Vincent's College. Oscar and Anna were married in Los Angles on December 17, 1901. Oscar soon found himself out at the Triangle Ranch and in charge of making the operation a success.

This was a year after lawman George Scarborough's death occurred by the hands of still unknown outlaws he and Walter Birchfield, the former Triangle Ranch foreman, had trailed into Triangle Canyon. The pair had been tracking the band after Walter found the carcass of a Triangle cow they had killed some eighteen miles northwest of the San Simon Station (near present-day Fan Structure). DeArment mentions in *George Scarborough* (1992) that Walter Birchfield, himself no stranger to outlaw cowboys, had brought Scarborough a mount to ride from his employer, Mrs. A. E. Rook, who undoubtedly was the Widow Ruch (see Rook's Well in San Simon Name Places). According to DeArment's notes, the name of the owner of the Triangle has been variously spelled "Rook," "Ruke," and "Ruck." DeArment was utilizing the spelling that Birchfield had provided in either his 1900 account of the shooting to Will Scarborough or in his 1939 interview with historian J. Evetts Haley, who authored *Good Man with a Gun*, the life story of Scarborough's good friend and lawman partner Jeff Milton. Oscar Roberts may have missed this first round of excitement, but there was more coming on the Triangle Range with the arrival of E. Waller McKenzie.

Oscar had previously operated a ranch in the San Simon Valley, but it is not presently known where. He did have "patented" lands (ca. 1911) located within Section 12 and 13, Township 13 S., Range 30 E., which were adjacent to land patented by

"Frederick Rush." In 1893 (Cochise County Platte Map *Township 13 S., Range 30 E.*). Being an educated man, Oscar had other interests outside of the grueling ranching life out on the Triangle. One of his interests was gambling, especially the game of poker. In 1902, the dwindling mining community of Paradise sported more "action" than did the station stops of San Simon and Bowie (Hayes 1999). Oscar would make the trip over to Paradise with his cowboys from time to time for a friendly game of poker. No doubt this activity did not endear him to his widow, who had spent many years out on that windswept sacaton flats trying to survive and make a living.

Oscar was not single minded to attending business out on the Triangle either. In 1909 he was elected a representative of Cochise County to the Territorial House of Representatives (Bailey and Chaput 2000). Sometime around 1911, either Anna or Oscar must have hired Tom Garrett, their hard-luck neighbor to the south, to manage the Triangle Ranch (Williamson 1939). Garrett was "talked into buying" a relinquishment on a 320-acre homestead south of the Triangle Ranch headquarters around 1911. He originally came to San Simon with the intention of drilling artesian wells for eager homesteaders. After he purchased his ranch, Garret's life centered around keeping the operation afloat, whether by chopping yucca stocks in freezing temperatures for drought-stricken cattle in 1924, or by drilling wells in the Texas oil boom of the 1920s. Tom came home from the oil fields in 1929 to find a neighbor "so vicious that it was unsafe to put any cattle on the range. They were either killed or run off." This could have been the future owner of the old Triangle Ranch, namely E. Waller McKenzie and his immediate family.

By 1913, Anna E. Ruch Roberts was prepared to give up the Triangle. Homesteaders were making steady inroads upon the open range that the Triangle depended on for grazing. The lack sufficient rainfall probably left the Triangle range in a state of steady decline after the droughts of the early 1890s. The torrential downpours of the early 1900s no doubt accelerated the erosion process that had begun with the earlier droughts. Conditions were right for a sale, and that sale began by turning the property over to Oscar in 1913. Oscar acquired the deeded land, Triangle brand, remaining cattle, horses, and ranch property (Cochise County Recorder *Deeds of Real Estate* Book 57). This paper transfer paved the way for the sale of the ranch to E. Waller McKenzie, representative for the McKenzie Cattle Company, on August 26, 1914.

The McKenzie Cattle Company and the Triangle Ranch: Early Years

The McKenzie Cattle Company was composed of "General" Gene or E. W. McKenzie, his brothers Thomas Newton McKenzie, Joseph Milton McKenzie, and James Franklin McKenzie. Joseph's son E. Waller was also a member and later became the focal point of their operations on the old Triangle Ranch. The McKenzie family left quite a paper trail of court, legal, and civil documents in Cochise County, and at times it is hard to distinguish which McKenzie is doing what with whom in the legal records. It seems that even the McKenzies had problems keeping their identities separated in relation to land deeds and property recorded in Cochise County.

E. Waller McKenzie is an enigma in the true spirit of the original western cattleman and rustler, mainly because he is known by several different names and several of his family members carry the same names. It is known that Eugene Waller or E.W. McKenzie, as he is referred to in Cochise County Records, was born on December 18,

1858, in York's Creek, Texas (RootsWeb.com 2003, Luling Library, Texas, McKenzie Family File ibid.). Eugene reportedly died on December 29, 1932. His grandfather, Joseph Milton McKenzie, originally brought the McKenzie family to Texas in 1839, finally settling in Prairie Lee (now Caldwell County) Texas.

E. Waller's father, Thomas Newton McKenzie, was born on January 31, 1828, at Patton's Ferry, Tennessee (McKenzie Family File 2003). His mother, Mary Jane Waller was born on May 24, 1841. Eugene was married on August 16, 1911 in Independence, Virginia to Laro Madge Blevins. The marriage took place not long before his association with the Triangle Ranch. He had been married previously to Lena Anne White but she died at Ft. Worth, Texas in 1905. A daughter, Ruth Anne was born to E. W. and Lena and died in 1905. It may be that Lena died while giving birth to daughter Ruth. Eugene and second wife Mary Jane had three children: Eugene Waller Jr. (born May 6, 1913 in El Paso, Texas), Houston Blevins McKenzie (born April 20, 1815 in El Paso), and Laro Virginia McKenzie (born July 5, 1918 in El Paso).

It becomes readily apparent that several members of the McKenzie family, namely father and son E. Waller, have the same names, adding to the confusion concerning official correspondence. It becomes even more confusing as Joseph Milton McKenzie, the brother of E. Waller Sr., also named his son Eugene Waller. This Eugene is referred to in Cochise County documents as E. Waller. Eugene Waller Sr. is referred to as E. .W. His brother Joseph Milton is listed on documents as J. M. Brother James Franklin is known as J. F. Finally, Thomas Newton, the last McKenzie brother in the partnership, is referred to as T. N.

The confusing array of McKenzie names has served to confuse generations of cowboys who worked with them and historians who wrote about them. According to cowboy and author Dan Moore (1965) "General [Ranald] McKenzie" had come to southern Arizona as a cavalry officer during the Apache Wars of the 1880s. Moore states that "after the last of the Apaches had finally been subdued he had returned to stake out this ranch on the San Simon, stocking it with the cattle he and his sons had driven in from Texas." Moore later names "The General" or Ranald McKenzie, and his two sons E. Waller and Ed as being the operators of the Triangle Ranch. Alden Hayes (1999) also states that Annie Ruch sold the Triangle to "General Eugene McKenzie.

According to Hayes, three McKenzie brothers jointly owned the Triangle, but its operation was chiefly the responsibility of "Gene" and his two sons." Hayes also states that Eugene "was originally from Midland Texas, and had been ranching since 1885 in Lea County, New Mexico." Once again the name "Old General" or Eugene is used in reference to E. W. McKenzie (Hayes 1999). The actual E. W. is shown as having acquired the patent to Triangle land through the transfer of a deed (#031349 and 034616)) in the SW ¼ of Section 3, Township 13 South, Range 30 East, Gila and Salt River Meridian. This is the location of the current Triangle ranch house structures (*Patent Map* Cochise County Assessor).

It is quite apparent that some confusion exists between E. Waller and another famous western character. Moore (1965) refers to E. [Eugene] Waller as "the old General Ranald McKenzie." Somehow E. Waller McKenzie had managed to become confused over time with the real General Ranald S. Mackenzie of Civil War and Indian War fame. The distinction is a great one. General Ranald Mackenzie was probably the

most widely experienced commander of U. S. Army troops during the "Indian War" period of military operations on the western frontier. If the title of "Indian Fighter" were to be fairly bestowed upon one who truly earned it, Ranald Mackenzie would probably be first in line for nominations before the famous Lt. Colonel Custer, or Generals Crook and Miles.

Nicknamed "Bad Hand" by the Indians for Civil War wounds to his hand, Mackenzie was a hard fighting cavalry officer who's attention was directed mainly toward defeating his enemy rather than embellishing the results (Hoig *Forward to Bad Hand* 1993). Mackenzie fought hostile Indian tribes from Montana to Texas, New Mexico, and Arizona. Mackenzie faced such great chiefs as Dull Knife of the Cheyenne Tribe and the wily Comanche chief Quanah Parker in battle on the plains and prairies of the West. He was a man who also fought great personal battles as well as physical ones. In the end, he was defeated by a growing mental instability that required his retirement from military service in 1884 and died on January 19, 1889 at the age of 48. Mackenzie was never married and did not have children.

In his notes section of *Adventuring with Old Timers* (1979) Hervey Chesley mentions the Mackenzie/McKenzie confusion and states the following: "This McKenzie was not Indian fighter Ranald S. Mackenzie but Gene McKenzie, who, with his brothers John [Joseph Milton ?] and Tom [Thomas Newton] located the first herd at Baird's lake, north of Midland, Texas. They sold out to Nelson Morris' C Ranch outfit in 1885 and moved over into New Mexico to establish the Dumb Bell Ranch outfit on Monument Draw."

It is quite possible that E. Waller Mckenzie was given the title "general" for the simple reason that his name resembled that of Ranald Mackenzie, who had been in Texas fighting Quanah Parker in the 1870s, and was well known to ranchers and cattlemen. It does not seem likely that the two are related. It is possible that E. Waller just assumed the title for his own personal reasons or cowboys associated with his cattle operation bestowed it upon him. It was quite common in the period of the open range of the post-Civil War era to bestow titles of command on persons who fit the mould of a commander or those in charge. E. Waller served as the leader for tough cowboys while making long cattle drives to Dodge City and beyond. He attracted a certain element that did not ask questions and were not opposed to picking unbranded cattle along the trail to the shipping pens of Kansas.

General "Eugene" McKenzie had, according to author Alden Hayes, the reputation of a being a rustler, but he didn't suffer from it. It would seem that E. Waller increased his cattle herds though the same methods that many other ranchers employed. Unmarked or "maverick" calves would be burned with the mark of the first cowboy or rancher who found them. The other widely utilized method was to tie or pen up calves to quickly wean them and then brand the "lost" calves with the rustler's brand. McKenzie became a well-known cattleman around Midland Texas, but the advent of barbed ware pushed him farther west in search of more open ranching opportunities.

Author Robert DeArment, in his notes section of *George Scarborough* (1992), mentions that the McKenzie brothers moved their cattle operations from Midland, Texas to Monument Draw, New Mexico in 1885. According to Hervey Chesley (1979), Eugene [E. Waller Sr.] McKenzie and his two brothers John and Tom moved from Midland,

Texas to establish the Dumb Bell Ranch on Monument Draw in New Mexico Territory. A. P. Black (1936) wrote that there were wanted notices out for "'General' McKenzie, Henry Harding [*sic*] and the rest of the outlaws operating around there . . . . The 'General' and his bunch were 'wanted' for burning [branding] the 'Jingle-Bob' brand of U into a dumbbell, O-O. Harding and the others were just wanted on general principles, they'd do anything that was profitable" (ibid.). It would appear that the brief notes available on E. Waller McKenzie's activities in both Texas and New Mexico point to his early involvement in rustling activities in both states.

Bob Beverly (Chesley 1979), another contemporary of E. W. McKenzie, had this to say about the General and his cattle operations:

> When they fenced the country north of Midland it pushed General McKenzie further west . . . All of this draw country [speaking of the Monument Draw, NM] over here was supposed to be a part of Texas. That east [boundary] line wasn't surveyed. Anyway, McKenzie had this bunch of renegades and was branding cattle from that country. They [McKenzie men] got so rank down there that they was killing JAL cows [the JAL Ranch, which Bob Beverly once managed] and everybody else's for the calves.

E. Waller is also mentioned in another event related to both the notorious gunman turned lawyer John Wesley Hardin, lawman and manhunter George Scarborough, and another long time rustler and gunman, Polish born Martin Mroz [Morose]. The full intrigues of this story are covered quite thoroughly in DeArments *George Scarborough.* Both DeArment (1992) and Dee Harkey (1951) support the theory that on April 19, 1895 E. Waller [Gene] McKenzie went to Juarez, Mexico and gave Mroz four thousand dollars

to distribute among Mexican officials who were holding him on rustling charges. Mroz and McKenzie had trailed cattle to Dodge City, Kansas in the past and started up a "partnership road brand" to increase their herd along the way (DeArment 1992). Lawman Dee Harkey (1989) knew Martin Mroz well during the early 1890s. Martin described their partnership event in this fashion to Harkey.

> I when over then to Texas, and went up the trail with General McKenzie. He had a road-brand that he put on the cattle that he bought for his trial herd. He would take a bill of sale to the cattle, and put his road brand on them. McKenzie and I started up a partnership road-brand, and when we got to Dodge City we had more cattle that we had picked up than McKenzie started with, so when sold them and divided that money.

The partnership must have been valuable enough to E. Waller that he was later willing to give Mroz four thousand dollars to be used to bribe the Mexican officers holding him. The "road-brand" scheme was just another tool that allowed rustlers such as McKenzie and Mroz to amass a considerable amount of cattle and money in a short period of time. But both wealth and success could be short lived in the rustling game, as Mroz was soon to discover.

This timely gesture succeeded in preventing Martin Mroz's extradition back to the United States to face charges of bringing stolen goods [cattle] into the city of El Paso. It also may have led to the death of Mroz at the hands of El Paso's U.S. Marshall George Scarborough and El Paso's Ex-Chief of Police Jeff Milton. Both were serving as U.S. Marshals at the time (Milton also held a Texas Ranger commission) when they enticed Mroz back across the border with the ruse of helping him with the stolen goods charge.

Mroz reportedly pulled his gun and the officers killed him in what critics would later say was a one sided gun battle designed to secure the five hundred dollar reward being offered for him in Texas.

This affair ultimately led to both the deaths of John Wesley Hardin, who as a lawyer had been representing Mroz's wife in El Paso, and "Uncle John" Selman, another cold-blooded killer turned El Paso lawman. Hardin had become increasingly intolerable in the El Paso community and had begun an affair with Mroz's former wife, Beulah. John Selman finally shot Hardin in the back of the head at the Acme Saloon on August 19, 1895. Some historians place the motive for the killing as one to many notorious killers in one place at one time. Others place the motive as a method to secure a sum of money that was reported to have been linked to Mroz and passed amongst all of the players in this drama (DeArment 1992).

The chapter finally ended on this chain of killings when George Scarborough, claiming self-defense, put several bullets into the body of old John Selman in the darkened alley behind the Wigwam Saloon on April 5, 1896. Selman died the next day. Strangely, Scarborough would also meet his end four years later at a location not more than 25 miles south of the Triangle Ranch. An outlaw gang that to this day has yet to be positively identified shot George in Triangle Canyon (Outlaw Canyon), which is located on the east slope of the Chiricahua Mountains. Scarborough, at that time employed as a New Mexico stock detective, and Walter Birchfield, foreman of the Triangle Ranch under Annie Ruch, were trailing the outlaws for killing a Triangle beef cow. Scarborough was hit in the leg and died of the wound on April 5, 1900, exactly four years to the date of Selman's shooting.

The McKenzie Ranch: Securing the Range from Competition

By 1914, E. Waller McKenzie and his brothers must have acquired enough capital or worn out both their welcome and the grass in New Mexico to the point where they needed new range. But times were rapidly changing and wide-open ranges were harder to find. The McKenzie brothers must have heard about the Triangle Ranch and decided to switch operations to the San Simon Valley. Cochise County tax documents show that the McKenzie Cattle Company was still based out of El Paso, Texas. It lists E. W., J. F., and E. Waller as incorporating partners in the cattle company in 1919. It appears that J. F. McKenzie sold his share in the partnership to E. Walter [E. W.] and E. Waller on June 21, 1919 (*Bill of Sale* Cochise County). As previously mentioned E. Waller was the nephew of General McKenzie and the son of James Milton McKenzie.

James Milton McKenzie also seemed to have been involved in the Mroz affair back in the 1890s. The *Eddy* [Texas] *Argus* newspaper of April 19, 1895 states that "Thomas Fennessy [*sic*], ex-county clerk, and J. M. McKenzie were in El Paso last Tuesday, having brought up a lot of cattle from Agua Caliente, 200 miles south of Juarez. . . . Vic Queen [partner to Mroz]. . . . was in Juarez that day mourning over the incarceration of Martin Mroz." Both brothers may have been members of the contingent that spent a considerable amount of time and money to protect Martin Mroz from extradition. It seems that the entire McKenzie family must have shifted operations to southeastern Arizona several years after this event.

Operations must have been successful enough to expand the cattle outfit in Arizona. J. M. McKenzie is listed as the purchaser of Hilltop, Arizona resident Mrs. M. L. Mosely's HV Bar brand and earmark (*Bill of Sale* Cochise County). E. Waller also

purchased the Bowie Market some time in the 1920s. The McKenzie family was certainly active in the livestock business during this period of time, and the McKenzie name can be seen throughout Cochise County documents. It is sometimes difficult to understand which McKenzie was recording documents because the brothers tended to use different name combinations. This practice tended to confuse county recorders and people who did business with them. Life must have become confusing enough for Edith McKenzie, the wife of nephew E. Waller or "Eugene" McKenzie, that she filed a document at the Pima County Recorder's Office on July 7, 1931. In it she explained that the two names of E. Waller McKenzie and Eugene were utilized interchangeably on patented land claims in Cochise County (Cochise County Recorder *Edith McKenzie* 1931).

In July of 1919, nephew E. Waller transferred the original inverted triangle brand of the Ruch brothers over to the McKenzie Cattle Company and ranching operations began in earnest (Cochise County Recorder). Moore (1965) stated that the McKenzie family had the reputation of being a "real hard-twisted outfit." He found out how serious life could get with the McKenzie family when he stopped by the old Triangle Ranch headquarters looking for a job in 1921. It was the middle of the summer and the ranch was not taking on any new hands, so Moore moved on north of the ranch headquarters. He was attempting to go through a particular gate, probably somewhere near Yellow Hammer Mill, when "Ed" [Jimmie or James Easton] McKenzie rode up fast and ready for action with a short Winchester 30-30 and a "six shooter stuck in the waistband of his Levis, Mormon style. His reins were looped over his crippled left arm"

Moore thought that he would just continue traveling through the pasture, but "Ed" told him at the business end of a cocked Winchester rifle "this is Triangle range, and you'll go where I say until you're off it!" Moore, a veteran of WW I, had seen plenty of action, but complied with his request just long enough for Ed to quit the country. He then eased back in the direction that Ed had tried to prevent him from going, and for good reasons. It seems as Ed had two unbranded calves tethered to a small mesquite grove up a brushy draw. The nervous mother cow was not sporting a Triangle brand, but that of the Hackberry or Rail N Cattle Company located near the Whitlock Cienega (ibid.). Moore rode on to the Rail N and informed Ed Gleeson, foreman and son of the owner John Gleeson, of his discovery, after he had secured a job with the outfit. "Those were Rail N calves as sure as Hell is hot", Ed affirmed. He further demonstrated, "that Triangle outfit would steal the pennies off a dead man's eyes!" The Rail N boys then made a nighttime ride down to liberate their cattle from the McKenzies impending "running iron".

It seems as previously mentioned that General McKenzie had a reputation of being a bit of a rustler even before he came to the San Simon Valley (Hayes 1999). Apparently he did not suffer from this labeling, possibly because people were afraid of what the McKenzies might do to them. More likely and pragmatically it was the simple fact that on the open range of the late 1800s and early 1900s unbranded cattle and calves were snatched up by any cowboy or rancher who thought he could get away with it.

If a large cattle outfit took up most of the available public domain rangeland, the small operators probably just figured that they were taking their cut of grass that could be theirs if they had the resources and cattle to utilize it. "Seed" cattle rustled from the large

outfits provided the beginnings of many a small-time livestock operation. Other characters such as "Curly Bill" Brocius were just outright cattle thieves who thought nothing of burying any man who stood in their way.

A good many of the cowboys who went to Arizona bent to the other side of the law when they found out that it was more profitable to sell stolen stock at twelve dollars a head that to work on a ranch for thirty dollars a month. Since many cowboys were veterans of the violence associated with Reconstruction-era Texas and the following range wars of New Mexico, they were certainly not intimidated by the risks involved in rustling (Young and Nelson 1999). The McKenzie family probably fit somewhat into this hard-bitten mould. But times were changing and the heavy-handed tactics of the McKenzie brothers were becoming both a liability and legal problem.

According to Alden Hayes (1999) the McKenzie brothers apparently left much of the Triangle operation up to E. Waller and Ed [Jimmie]. After evaluating the various names and activities of the McKenzies, it appears that the two sons of Joseph Milton McKenzie [J. M. or John] were responsible for operating the old Triangle Ranch. This would be E. Waller and James Easton McKenzie, who were nephews of E. W. or "General" McKenzie. The General's address is usually listed as El Paso, Texas on deeds and other recorded transactions. E. Waller According to Clark Martin (1993) the old "General" ran cattle "mainly west of the [San Simon] creek down to within one mile south of Martin Well." The cowboys that McKenzie brought to work for him were mostly hard cases who knew that the boss did not frown upon harassing "nesters" or homesteaders with small cattle operations that ate chunks out of the Triangle range. One of the latter was a lean, and somewhat cantankerous small-time rancher and homesteader

named John Camron (Hayes 1999). Camron is said to have fought "General" McKenzie over issues related to rangeland and water (Martin 1993). Camron was reportedly shot in the genitals by "several Triangle [ranch] boys" while on his way to San Simon (Hayes 1999).

Hayes (ibid.) attributes it to cowboy antics gone wrong, but there was no love loss between the two factions and a hit was as good as a miss, or rated even higher once the target location was determined. Other San Simon locals have related that Camron was shot because he repeatedly came to San Simon to steal chickens for his supper later on that night back at his ranch. Whatever the reasons, the shooting almost landed E. Waller McKenzie in prison for attempted murder. Moore (1965) who traveled through the area in the early 1920s as a cowhand stated that "E. Waller McKenzie shot neighbor, John Cameron, and was sent to the Penitentiary."

The true story of the incident may be lost in the criminal archives of Cochise County. The facts of the matter concerning the Camron incident are presented here. The above events related by Hayes and others may actually be pure speculation or just outright cooked over gossip. On October 21, 1916, J. M. [John] Camron and J. M. [John or Joseph Milton] McKenzie recorded a joint "Notice of Water Appropriation" at the Cochise County Recorders Office (Cochise County Miscellaneous Documents Notice of Water Appropriation Book, 161). The two were planning to construct a "dam and reservoir" at a seep or spring know as the Seep Spring Mining Claim, located on the "NE ¼, Section 24, township 12, S. range 31 E. G. & S. R. Meridian, in Cochise County Arizona." This location is directly northeast of the "Old McKenzie Ranch" as located on the 1950 San Simon Quadrangle (U.S DOI, Geological Survey 1950). Apparently J. M.

based his operations out of this ranch location in the Peloncillo Mountains northwest of Doubtful Canyon (ibid.).

This left John Camron in control of Indian Springs, where his homestead was located and the Tule Wells area. John McKenzie was in control of the old Ward Springs and Canyon (formerly of Ward, Bowers, and Ruch) Canteen Springs, the Artesia Well, and of water located around the Triangle Ranch. The Triangle water assets consisted chiefly of West Well, possibly Yellow Hammer Well, the Triangle Ranch Well, and other open sources near the Fan area (Cochise County Assessor's Office *Patent Map* T. 12 S, R. 31 E). The McKenzie Cattle Company also controlled Bear Sign Seep (NW ¼, NW ¼, Section 7, T. 12 S., R. 31 E.). The McKenzies also had a dirt tank located southeast of the [Bill] Wheeler Place (U.S DOI, Geological Survey 1950, Cochise County *Notice of Water Appropriation* Miscellaneous Records page 422).

It would therefore seem that the McKenzies had adequate water for their stock but maybe it just was not within their nature to tolerate competition from any other rancher. More than likely it was a combination of overstocking, drought, deteriorating range conditions, and competition that led to the shooting of John Camron. According to Moore (1965) the McKenzie Ranch ran approximately 3,000 head of cattle in 1921. Times were probably getting tough in the San Simon Valley and would get tougher with the drought of 1924.

The hard times were hitting other ranchers located south of the McKenzie ranch. J.M. McKenzie also purchased 35 head of cattle and 30 calves for $400 at a public auction of the Lyall family ranch's assets in September 15, 1921. It appears that the San Simon Valley Bank brought suit against the Nellie and E. A. Lyall ranch for failure to

make payments and won a judgement against then for $518.50. Water and capital were essential for keeping operations going and it appears that both were becoming scarce.

The stage was set for a conflict over water as conditions on the range around the San Simon River and Valley began to deteriorate even further. Water was essential for the cattle of both John Camron and the McKenzies. Without secure water sources the cattle couldn't be moved around to take advantage of available forage and the costs of both operations would rise. Apparently the two sides had a falling out. It is not known if the partnership on the tank was the cause of the conflict. Quite possibly it was just a case of heavy-handed tactics on the part of the McKenzies in dealing with perceived threats to their water and range.

One other piece of evidence exists that might point to the reason for the proceeding troubles. John M. Camron and Fred H. Peel recorded a quitclaim notice to the Tule Wells area in the Cochise County Recorders office on the 24th of May 1923. In return E. Waller and E. W. [Ed] McKenzie of the McKenzie Cattle Company agreed to drop a civil complaint and criminal contempt of court charge (Cochise County Superior Court Docket Number 4735) they had brought against Camron and Peel. Obviously there was bad blood between the two parties at least several months before the shooting occurred. Several factors were for certain. The San Simon area was in a drought cycle by 1923 and the conflict finally escalated to the point of violence.

Justice court documents for Precinct Number 15 of Cochise County record a criminal complaint against both E. Waller and J. M. McKenzie. The complaint (Docket Number 3268) alleges that the defendants "premediately, deliberately and of his malice aforethought commit an assault in and upon one John Cameron, a human being, with a

pistol, with intent then and there to kill and murder him, the said John Cameron, with said pistol." If we return to the Hayes (1999) account of the story, John Camron was shot in the following manner

> One day John took a wagon into San Simon for supplies. On his way he met several Triangle cowboys, who hooted at him as he passed. To urge him to get a bit more speed out of his team, they fired a few pistol shots in his general direction. They [John and E. Waller McKenzie] probably intended only to scare him and his horses, but one round went through the back of the wagon seat and wounded him in the genitals. The team *did* move faster and got him to San Simon after a painful ride and some loss of blood.
>
> The event was the subject of conversation in the community for several days. Ross Sloan, one of the Triangle cowboys who hadn't stayed on when the new owners [McKenzie] moved in, was in A. B. Husley's San Simon store for sundries. Mrs. Hulsey asked him where John was wounded. Victorian prudery wasn't dead yet, and Ross was stumped for a moment. He looked down at his boot for help and said, "Well, Mrs. Hulsey, if he'd been a woman it would have missed her."

Alden Hayes must have not been privy to the court records or the history of conflict between the two parties, because on October 10, 1923, both John and E. Waller were arrested and John posted a $5,000 bond with agreement that he appear to answer the charge. It is unclear whether John's son, E. Waller, did the shooting or whether "General" E. W. pulled the trigger. A good guess would place young E. Waller behind the smoking .45. According to the docket sheets E. Waller entered an unknown plea on

October 25, 1923 and the case was finally dismissed on April 12, 1924. It would seem that time and lack of interest were in E. Waller's favor. Fate and the law would catch up with E. Waller once again in the San Simon Valley with drastically different results.

Drought and Prison for E. Waller: The End of a McKenzie Era

Life did continue on at the various McKenzie operations in spite of the sensationalism of the shooting. Cattle were bought and sold as several banks and corporations began to become key player in controlling the cattle trade in the San Simon Valley. The bank of El Paso was involved in earlier transactions with the McKenzie family. On December 29, 1921 Walter McKenzie [the General] recorded the selling of cattle to Waller through the City National Bank of El Paso (*Bill of Sale* Cochise County).

By 1924, the pattern of court documents begins to change as the McKenzie family members began to sell lands and stock as opposed to purchasing assets. Mrs. E. Waller McKenzie is recorded as having sold a windmill and one Ford Sedan to Mr. W. H. Dunn on March 3, 1924. The windmill was located in Section 16, T. 11 S., and R. 29 E. No windmill is located in Section 16 today, which is north of the Fan Structure. On that same 3rd of March 1924, E. Waller McKenzie and Edith McKenzie, parents of Arthur McKenzie, sold to W. H. Dunn the "T T Double Bar" brand and all cattle branded with the same brand. The McKenzies may have been liquidating their assets in the San Simon Valley at this time because of possible family financial troubles coupled with an ongoing drought and a seriously depleted range. Clark Martin, former employee at the USDA Santa Rita Experimental Range Station and longtime range management specialist, grew up near the Fan area of the San Simon Valley. He distinctly remembered the drought of 1924, where cattle died on the San Simon range by the thousands (Martin 1993). On

June 5, 1926, the Kineo Land and Livestock Company secured an option agreement with J. M. McKenzie for the "sole and exclusive right and option to purchase" essentially all assets of the McKenzie Cattle Company, to include land, water sources, and improvements (*Option Agreement* Cochise County 1926). The Kineo Land and Livestock Company was the name of a corporation formed in Portland, Maine by four eastern investors and Arch Wilson of Willcox, Arizona. It is unclear what happened to the corporation, but they did not succeed in purchasing the McKenzie Ranch.

Dan Moore (1965) states that "after son, E. Waller McKenzie shot neighbor, John Cameron, and was sent to the Penitentiary, the "Old General died and the ranch went out of existence in the middle twenties." He also stated that "overgrazing and erosion have pretty well ruined what was once a good grass country." Moore was right on both accounts, but his facts were off the mark. The complexity of McKenzie family names and E. Waller's continuing career in crime have made it difficult for authors to sift out the facts of just what happened to the McKenzie Cattle Company.

On March 11, 1930 E. Waller McKenzie was charged with the crime of grand larceny, with gist of the offense being the theft of one cow near the town of Bowie, Arizona. E. Waller pled not guilty to the charge, and the cause was continued from time to time and finally tried before a jury on February 23, 1931 (Statement of Facts Cochise County Superior Court 1931). It seems as if E. Waller was following in the footsteps of his uncle, but the times had changed and society was less tolerant of rustling by the 1930s. E. Waller was found guilty on February 24, 1931 and sentenced to serve one to three years in the State Penitentiary at Florence. E. Waller served approximately eight months in the State Prison at Florence. At the time he was 45 years old. He was a model

prisoner, having spent most of his time working as a trustee in the barn shoeing horses. He easily obtained parole in October of 1931 with the stipulation that he be allowed to leave the state of Arizona (*Proclamation of Parole* 1931). E. Waller, with his wife acting as power of attorney, had already sold the entire "McKenzie Ranch" to Charles J. Gardner on July 7, 1931. The couple then left for New Mexico. "General" Eugene McKenzie died on December 29 1932. Joseph McKenzie died several years later on October 17, 1938. Thomas Newton McKenzie died August 25, 1935 and James Franklin died March 4, 1939. The San Simon quadrangle map (USDOI Geological Survey) of 1950 still listed the "Old McKenzie Ranch" and the mountain located near J. M. McKenzie's former ranch in the Peloncillo Mountains is still known as McKenzie Peak.

E. Waller McKenzie's story was far from over after his 1931 parole. His prison records from Arizona contain a copy of Waller's Federal Bureau of Investigation file (*Form 6* July 24, 1936). In the file it shows E. Waller being arrested again on July 17, 1936 by the Gallup, NM Sheriff's Office on the charge of "confining five calves separate from their mothers." According to the file, E. Waller was released on a $1,000 bond. On July 31, 1936, Mr. C. Shannon, Investigator for the Cattle Sanitary Board of New Mexico sent a request for E. Waller's file to the warden of the Arizona State Prison at Florence. The warden's secretary, Alva L. Weaver responded that Waller had been a good prisoner and was released on parole (*Letter to C. Shannon* August 5, 1936). That correspondence is the last bit of information available concerning E. Waller's fate in New Mexico. It would seem that the times had caught up with a man who was raised on the open range and had seen those times of maverick calves and hard cattlemen become a thing of the past in his own lifetime.

The Triangle Transitions to Charlie Gardner: An overview of the range.

At this point, it may be useful to return to Clark Martin for an overview and description of the range that encompassed the old Triangle Ranch circa 1920 to 1930. Martin (1993) describes four major ranch "spreads" for the time period of the 1920s. First was the McKenzie Ranch as previously described operating for the most part west of the main San Simon Channel within a mile south of Martin Well.

Second, the "Joy Valley spread" which encompassed the area "generally east of [the] creek to the mountains generally 5-10 miles north & south of Martin Well. Primary waters [wells] were Joy Valley, Little Artesia, Coyote and Yellow Hammer Wells." Third listed was the 111 Ranch, owned and operated by William Ellsworth, a prominent Safford area rancher. According to Clark Martin, the 111 Ranch laid "west of [the San Simon] creek and extended from the county line [Cochise and Graham] north perhaps to Tanque and west to the railroad [old Gila Valley, Globe and Northern tracks]."

Lastly, there was the "Eugene Seeley Ranch." Clark describes this ranch location as having its "HQ at Hackberry" and lying "against the Peloncillo [Mountains] on the East, Whitlocks [Mountains] on the West and South." The ranch then "ran north to within a few miles of the Duncan-Safford highway." This is the "Rail N Ranch" referred to by Dan Moore (1965) after his run in with the McKenzie boys. In fact, the first two people Moore ran into when he neared the Rail N were "two brothers....their names were Martin." The brothers were undoubtedly Clark Martin's father Lee and Clark's uncle, Richard Martin. Lee Martin was probably working as the "windmill repair man" and Richard was "doing the cooking for the outfit" as described by Moore. Richard later

served as a Prohibition agent for the government at Bowie. He is said to have killed a man, presumably in the line of duty (Martin 1995).

Now that the principal players have been described, it is time to examine the First National Bank of El Paso's role in the turn of ranching events that took place near the Triangle Ranch in the 1920s. The matter of the bank's role here is further confused by the three separate statements made by Clark Martin concerning the History of the San Simon Valley (1993 typed notes, undated notes page of 1993, undated notes, and June 5, 1995 interview with Raymond Reed [online]). In 1995 Clark stated:

> Lying East of where we lived, the [Joy Valley] country, had been controlled as one ranch from time to time and probably in 1922 or thereabouts, the First National Bank of El Paso financed an outfit that brought about 5,000 head of cattle into that area-far too many cattle, in fact so many cattle that the watering places that went with the ranch could not supply the needs of the cattle. So they made a deal with Dad to water the cattle at out place with the artesian water. In the drought of 1924 they began to lose cattle that they could hardly get them out quick enough.

In "The San Simon Valley as I Recall" Clark states:

> There were few cattle in the Joy Valley country around 1920. Soon after this the 1st National Bank of El Paso, who apparently owned the stock waters [Joy Valley, Little Artesia, Coyote and Yellow Hammer Wells], stocked the area with about 5000 cattle. Cattle numbers exceeded the capacity of the bank's wells. Dad then sold water from our well to the ranch operator. But, when drought struck in 1924, cattle ran out of forage as well water and death losses were extreme. Cattle were

gathered as rapidly as possible. The process left many dogie calves behind. The few that Dad saved became the foundation for his livestock enterprises.

The accounts are similar enough to paint the picture of the 1924 drought that probably hastened the sale of the Triangle to Charlie Gardner. One has to wonder if the City Bank of El Paso that was mentioned in the 1922 McKenzie Bill of Sale for delivery of "X Diamond" cattle and the 1st National Bank were connected or one in the same. If so, the McKenzie brothers could have been the ones who brought in the 5,000 head of cattle that Clark Martin talks about.

Charlie Gardner and the Triangle Ranch: Bank Backers and Water Feuds

Charles Gardner assumed control of the Triangle range with his purchase of the ranch around 1926. Hayes (1999) refers to a Charlie Gardner and his wife Jennie Barfoot Gardner. Gardner was raised southwest of San Antonio, Texas, but by 1900 he had already spent 25 years working cattle in southeastern Arizona (ibid.). Government documents (*Murchison Conservation Area* 1965) concerning the ranch describe Gardner's ownership as such:

> Ranches slowly began to emerge by leasing numerous private tracts of land to form a foundation area that could be fenced against open range stock. These blocks were augmented by State selections, and by 1926 Gardner had enclosed some 44,000 acres of which 5,000 acres were leased from absentee owners.

The cycle of feuding over water and forage would continue in the area, but with new contestants, Charlie Gardner and Frank Williams. The stage was set for a new feud over water between Gardner and the Williams. According to Clark Martin (1993), the First

National Bank of El Paso financed Frank Williams and his sons to stock the range after the drought of 1924. Clark (1995) states:

> It was sort of a story, the cyclic thing, under the open range program. After the die-out in 1924, that venture moved out [McKenzie, Camron]. There weren't many cattle in that area for several years. There were some fairly good seasons in 1930 or 1931, then the bank financed another rancher [Frank Williams and sons] to come in and they stocked it mainly with steers, but ha had cows and calves as well. That lasted until 1934 and that drought, they had to [destock or sell off] cattle. That was the last two cycles of the boom and bust thing that went with open range raising [on the former range south of the San Simon Fan].

Gardner and Williams both needed access to the depleted range and competition grew for the grass and water that remained on the east side of the San Simon. Frank and his sons "Little Frank" and King patented land in Township 12 S., Range 31 E., Gila and Salt River Meridian. "Little" Frank (Frank E. Williams) patented the northern ½ of the NW ¼ of section 6 (March 29, 1938), and lands in section 31 of Township 11 S (Little Frank's Place and Conversations with Frank Nuwman 2003). King (Andrew King Williams) patented half a section of land (1935-1939) to by combining land from sections 5, 8, 9, and 22 of Township 12 S. The Williams were feuding with Gardner long before these patents were secured or even filed.

The First National Bank of El Paso owned the Yellow Hammer and Coyote Wells, so they essentially controlled the watering areas from the old Triangle Ranch headquarters to Martin and Howard Wells. Without secure water, Gardner had no way to

keep his cattle on the range, so he drilled his own well, and had the good idea to name it "First National Well' after his rival's backer (Martin 1993).

The drought of 1934 must have damaged Charlie Gardner's cattle operation on the former Triangle range, because shortly after that the Murchison brothers took over ownership of the ranch land and headquarters. Government documents (*Murchison Conservation Area* 1965) state that "Gardner operated for some ten years before selling to the Murchisons." J. B. Murchison, Jr. and R. B. Murchison received ownership of the Triangle Ranch lands on May 15, 1936 (Cochise County Assessors Office). The land would become known as the "Murchison Tract" in Federal government documents later on as they went through their last stage of ownership. By this time, the once productive grassland was in a significant downward spiral of decline after three distinct periods of forage "boom and bust." The Murchisons held on to the lands for just 6 years before they transferred ownership over to the "U. S. A." or Federal government on December 12, 1942.

The Reclamation Years: Soil Conservation Service and Bureau of Land Management Control of the Triangle Ranch

The Soil Conservation Service (SCS), a branch of the Department of Agriculture took control of the Murchison Tract and began to develop a comprehensive reclamation and restoration plan for the range and river channel. The Bankhead-Jones farm Tenant Act of 1937 provided the means for the Federal government to acquire control of the San Simon in, as government documents (*Murchison Conservation Area* 1965) describe, "its long battle to correct the ravages of this outlaw drainage."

According to Federal documents (ibid.) the Murchison Ranch was purchased by the government in February, 1943. This is several months behind the date recorded by the Cochise County Tax Assessors, but it is fairly close as far as land tenure documents are concerned. The Soil Conservation Service (SCS) purchased the ranch and administered the facilities until Executive Order 100046 of March 24, 1949, transferred the lands to the Bureau of Land Management (ibid.).

The Federal government's re-purchase of these lands, under Title III of the Bankhead-Jones Act, indicated that the lands were to be utilized for "erosion control, restoration of the San Simon watershed, and *limited* grazing." Just how limited this would be seemed to fluctuate over the years as the ideas of the original project were lost in a changing of the management guard and waning Federal interest in reclamation projects.

The Bankhead-Jones Act was amended to allow right-of-ways and then exchanges when they would promote the intentions of the original act. According to the 1965 federal report "all phases of land occupancy, use, misuse, depredations and restoration are evident in this area." The same words are true almost forty years later. Large earthen dams such as the Fan Detention Structure have re-graded large stretches of the main San Simon channel in areas where past herds eroded river banks in their quest for survival. Large-scale revegetation projects have proved less successful and the area still suffers from the relentless hoof beats of hungry cattle and from the ravages of erosion. Tom Garret may have summed up this stretch of country best when he stated "I don't know where else a man can live so much and get so little out of it."